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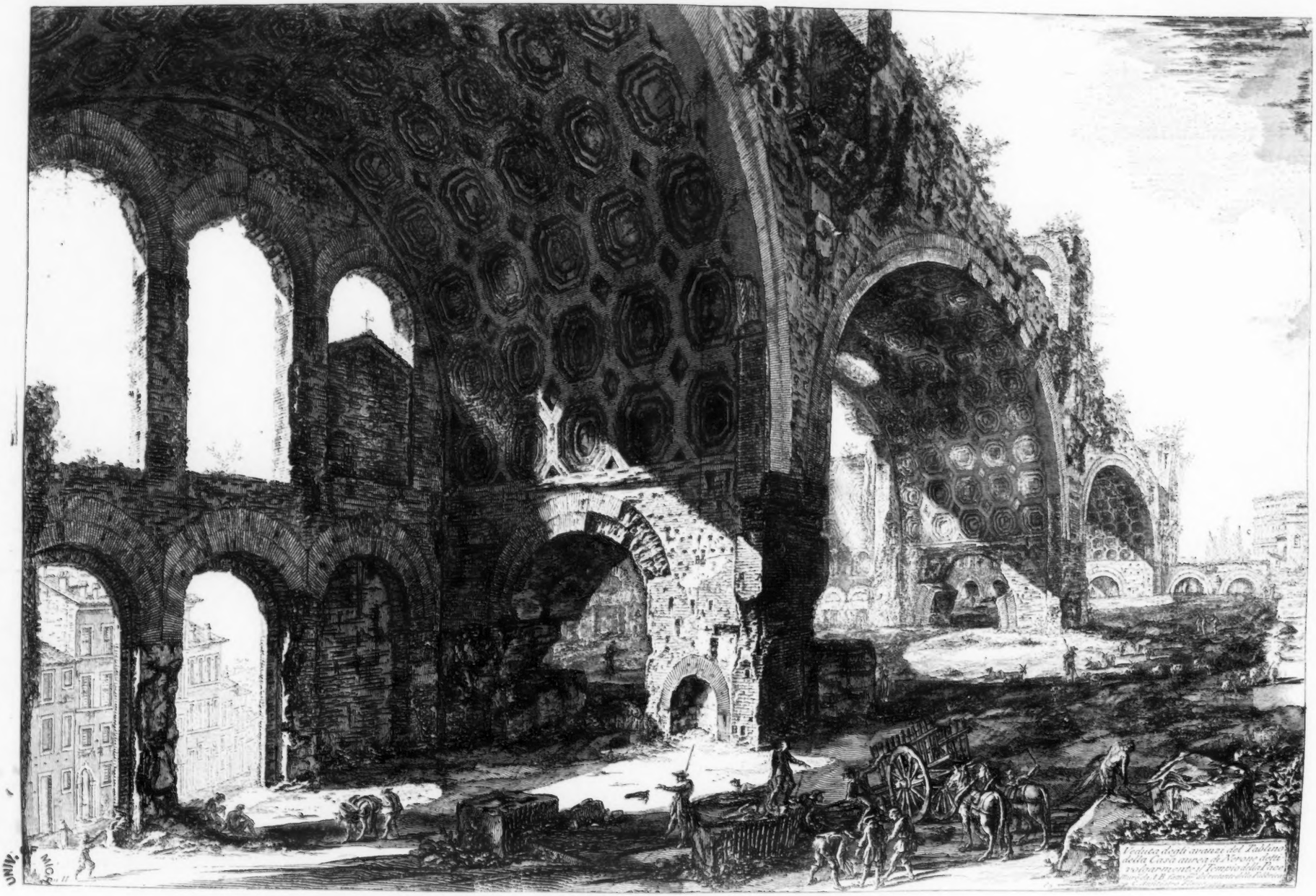


THE BASILICA OF CONSTANTINE, NEAR THE FORUM, ROME.

GIOVANNI BATTISTA PIRANESI, DEL.

These ruins show the remains of a Basilica, or court of justice, completed by Constantine, the first Christian Roman Emperor (A.D. 305–337). This grandest and latest of the Imperial buildings of Rome follows the model of the great central rooms of the imperial baths, especially the baths of Diocletian (284-306) transformed by Michel Angelo into the church of Santa Maria degli Angeli. The three existing arches engraved by Piranesi represent only one-third of the original building, something like the aisle of a church. Each is 68 feet in span and 80 feet high. A corresponding set of arches existed to the right, while the huge central nave had vaulting of a span of 82 feet and a height of 114 feet.

THE BRICKBUILDER

VOL. XIX. NO. 9. SEPTEMBER, 1910.

Hints on Architectural Acoustics.

BY HUGH TALLANT.

PART II. (CONTINUED).

COMPUTATION AND PRACTICE.

THE practice of architectural acoustics consists mainly in the elimination of defects. Positive results can be attained only by tentative methods and through successive modifications in design. In the case of a new building the preliminary sketches should first be laid out with a general view to acoustic as well as architectural requirements. The exact conditions at critical points can then be investigated by the methods already described.* Should defects be discovered the drawings may be amended to suit; the acoustics again tested; further corrections made; and the process repeated until the results prove satisfactory. In the case of an old building the problem is simplified to the extent that the shortcomings are already in evidence, but the requisite alterations must usually be studied out on paper by the same tentative methods before they can safely be put in execution.

The most dangerous defects are *insufficient or excessive loudness; indistinctness due to interrupted reverberation; indistinctness due to sound-interference; echo;* and *insufficient or excessive reverberation.* We will begin by showing how this somewhat formidable array may be overcome by alterations in shape, materials, contents and arrangement. The treatment of special sizes and types of auditorium will then readily follow.

The question of loudness seldom arises in connection with a small auditorium. Where there is no difficulty in addressing the furthest members of an audience there is no excuse for shouting at the nearest. On the other hand, there are few auditoriums over 80 feet in depth where the sound is not as much too loud at some points as it is too faint at others. In a music hall or opera house the seats next the orchestra are usually worthless, and in the average theatre much of the illusion is lost to the occupants of the front rows, who cannot help perceiving that the actors are speaking far above a normal tone of voice.

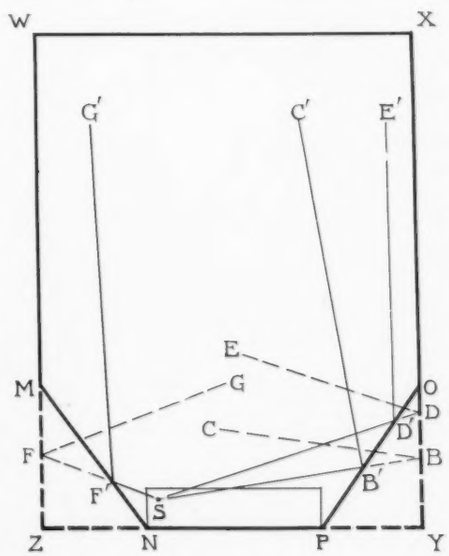


FIG. XIV

It is not in the nature of things that the sound should be quite so loud at the rear of an auditorium as at the extreme front; nevertheless the discrepancy may be largely neutralized by the following expedient. Let Fig. 14 represent the plan of a rectangular auditorium, all of whose dimensions are over 50 feet. The initial loudness in the vicinity of the speaker, S, is largely accentuated by sounds deflected along the paths BC, DE, FG, etc. If, however, the angles YZW and XYZ be cut off by walls running in the directions MN and OP, these same sounds will now be deflected along the paths B′C′, D′E′, F′G′, etc.; and will thus be transferred from the front and centre of the auditorium to the sides and rear, with benefit to both. The procedure may be carried even farther. It will be noticed in the diagram that B′C′, D′E′, etc., have a tendency to radiate. This divergence corresponds roughly to the spread of the sound-wave. The greater the distance between the paths, the fainter the sound. But if the deflecting walls MN and OP be curved, as shown in Fig. 15, the divergence of the sound-paths and the consequent diminution in loudness will be largely prevented. Of course the same principle applies to the angle between the ceiling and the front wall, which may be cut off with similar advantage, as shown in Fig. 16.

The same expedient may be used to advantage in another way. It has already been mentioned† that, in a theatre, the first deflected sound is apt to reach the hearer at so long an interval after the direct sound as to cause indistinctness. Even in other types of auditorium the first few sounds often arrive with such irregularity as to occasion similar trouble. The difficulty usually

* See THE BRICKBUILDER for July and August, 1910.

† See THE BRICKBUILDER for July, 1910, page 158.

arises when the speaker is located on the same side of the house as the hearer. This fact is illustrated in Fig. 17 where the speaker is supposed to be standing at S, while the hearer occupies an aisle seat at A_1. The principal

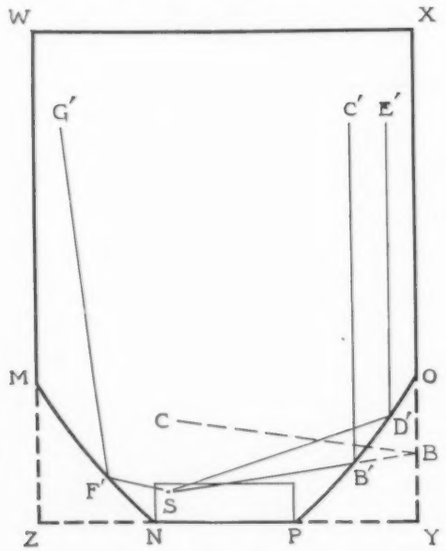


FIG XV

sound-paths arranged in order of actual (*not projected*) length, are SA_1, SB_1A_1, SC_1A_1, SD_1E_1A, $sf_1g_1a_1$, sQ_1a_1, SH_1A_1, $SK_1L_1A_1$, etc. Upon comparing each path with the next it will be found that up to $sf_1g_1a_1$, the successive increase in length is small and fairly uniform. Between this path and sQ_1a_1, however, the increase is so abrupt that in a large auditorium it may easily amount to over 70 feet. If similar tests are made at a_2, a_3, a_4, etc., it will be found that this sudden discrepancy in the lengths of the sound-paths has a tendency to diminish as the distance from S increases so that finally a point, *a*, will be reached where *sQa* is only

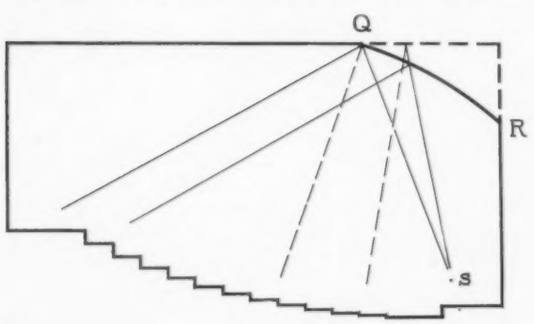


FIG. XVI

70 feet longer than *sfga*. It therefore appears that at all points from *a* to the rear of the auditorium the sounds follow one another so closely as to produce the effect of a continuous, and possibly agreeable, reverberation. On the other hand, at all points between *a* and the speaker there will occur a perceptible interval of time during which no sound will reach the hearer, and the effect of this break in the reverberation will be that familiar and disagreeable sensation of continually losing a syllable of the discourse.

The obvious remedy for this difficulty is to fill in the break in the reverberation with one or two additional sounds. As a rule, however, this is more easily said than done. Just how to introduce deflecting surfaces which will develop sound-paths of the precise length and direction required is a problem whose solution varies with the case in point, and often demands much architectural ingenuity. One expedient is to lower the ceiling at the front; but so radical an alteration is often prohibited by decorative or practical requirements. A large niche behind the speaker is sometimes efficacious. At best, the

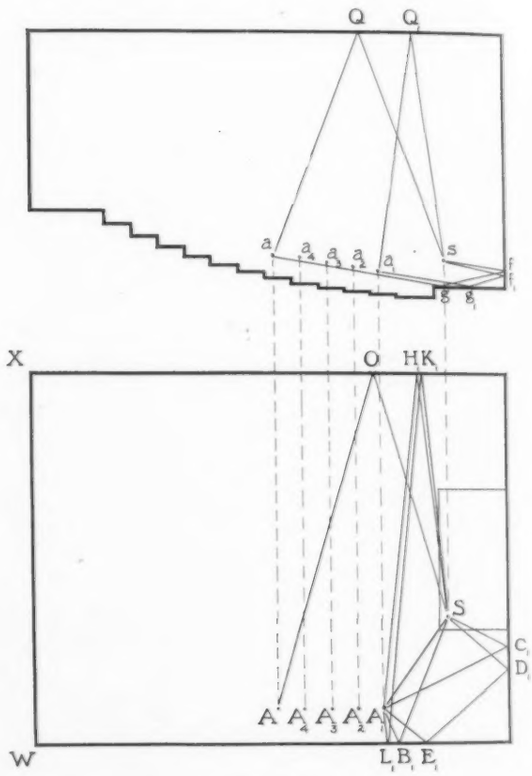


FIG. XVII

proposition is complicated to a degree, and the theoretic conditions difficult to express in architectural motives. A far better remedy — provided that the rear wall, WX, is an almost perfect sound-absorbent — is to pass deflecting surfaces through the points M, O and Q, as indicated in Figs. 15 and 16. It is sufficiently evident, without prolonging a tedious discussion, that this procedure will so alter all the longer sound-paths, such as SBC, Fig. 15, as to eliminate practically all the reverberation subsequent to the break, leaving the initial effect sharp and distinct. The same deflecting surfaces which are of such advantage in equalizing the loudness of the sound can thus be made to do additional duty in eliminating indistinctness. It is merely necessary to make them pass through M, O

and Q. The precise inclination and curvature may then be adjusted so as to concentrate the sound wherever it is most urgently needed.

Contrary to what might be expected, the most distant point from the speaker is rarely the one where the sound is the faintest. Conditions at the back of the top gallery are usually very satisfactory, because the direct sound is reinforced by deflections from the ceiling as well as from the side and front walls. Many a gallery-god holds down a seat acoustically far superior to those for which his betters below have given up five times the money. The real danger-point occurs in the space underneath the balcony where the deflections from the ceiling cannot penetrate.

The contour of this sound-shadow can be readily plotted by the geometrical construction indicated in Fig. 18. It is merely necessary to draw *bc* perpendicular to *wx*, prolong it to *d*, making *cd* equal to *bc*, and draw *des* and *eba*. The point *a*, thus determined on the section, will be projected in plan at A. In this way any number of points on the edge of the shadow may be determined. The surfaces MN, OP and QR may then be adjusted so as to deflect as much sound as possible into the shadow. The starting points M, O and Q are, of course, already determined by considerations of distinctness. The exact positions of N and P are relatively unimportant, acoustically, and may be determined to suit decorative or practical requirements. There is, however, an advantage in placing R as low as possible in order that QR may concentrate its deflected sound as far back as possible under the overhang of the balcony, and for the same reason the inclination at R should be such as to deflect the sound in the direction R*f*, just escaping the edge of the balcony at *b* by a foot or so. This can be accomplished by making the inclination R*h* at R perpendicular to the bisectrice of the angle *sRf*. In the same way the sound from Q should be deflected in the direction *Qa* by making the inclination *Qk* at Q perpendicular to the bisectrice of *sQa*. If the curvature of QR is now laid out tangent to R*h* at R and to *Qk* at Q the deflected sound will be largely concentrated between *f* and *a* — that is, as far back as possible under the balcony. A convenient and accurate method of accomplishing this result is to pass an ellipse through Q with one focus at *s* and the other focus at a point about a foot from the edge of the balcony. The intersection of this ellipse with the wall *xy* will determine the point R. All sounds from the focus *s* which strike the elliptical surface will, of course, be deflected through the other focus, from which they will be distributed almost uniformly between *a* and *f*. The position of R may be lowered if necessary by increasing the distance *Qx*.

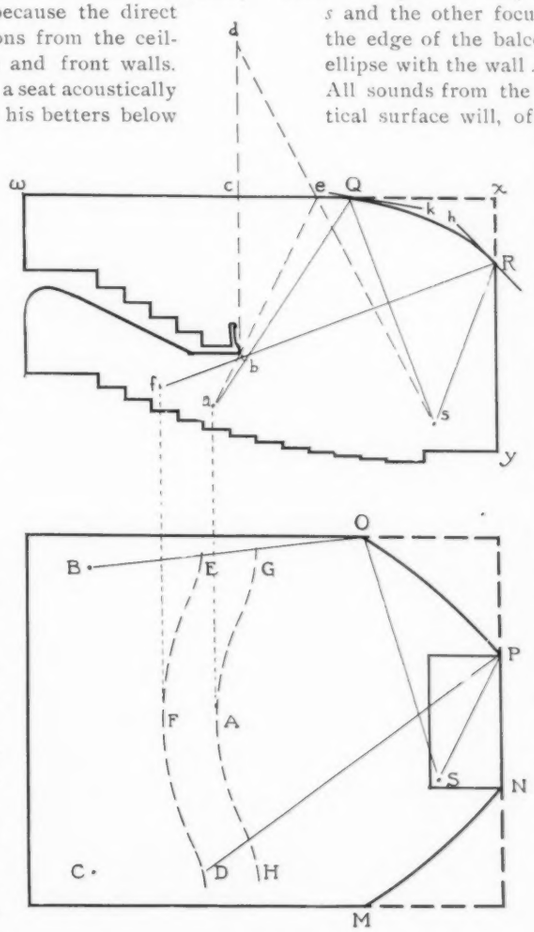


FIG. XVIII

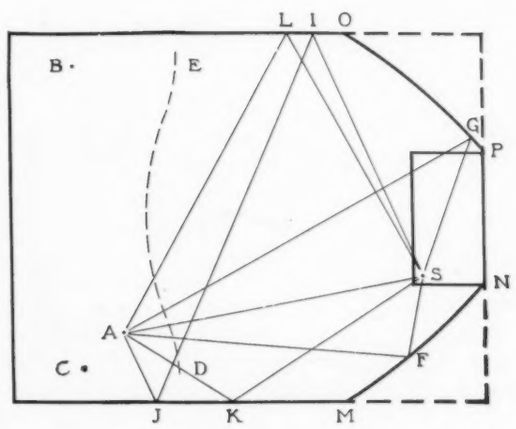


FIG. XIX

The deflections from MN and OP may now be utilized to strengthen the sound at points where the deflections from QR cannot penetrate. If the sound from QR is distributed in plan over the space DFEGAH the sound from OP should be distributed over the remainder of the sound-shadow, or between the two aisle seats B and D. Assuming that the speaker is placed at S, the most unfavorable position, the curvature of OP should be such that the tangent at P is perpendicular to the bisectrice of the angle SPD, and the tangent at O perpendicular to the bisectrice of SOB. By similar means the sound from MN may be concentrated between C and E. The net result will be that at any point, A, Fig. 19, within the zone of darkest shadow BCDE, the initial intensity of the sound will be made up of the following components:

One direct sound SA.
One deflected sound SFA.
One deflected sound SGA.
Two deflected sounds SKA and SLA.

SFA and SGA are each approximately as loud as SA because of the concentration caused by the curvature of MN and OP. SKA and SLA together aggregate something more than SA. The total intensity therefore amounts to at least four times that of the direct sound, and is amply

sufficient up to a distance of 100 feet from the speaker. In this calculation the deflections from NP have been neglected because they are not always available; also such double deflections as SIJA, because they are apt

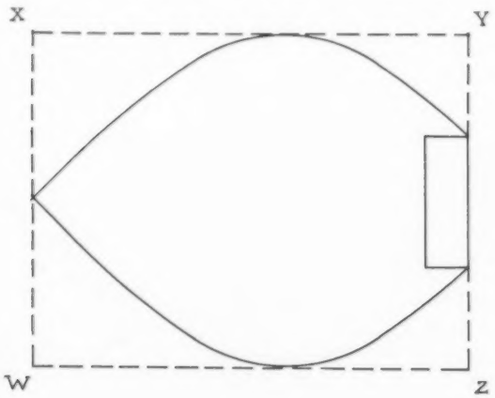


FIG. XX

to arrive more than a fifteenth of a second after the direct sound. Even with these deductions, however, it is possible to develop an initial intensity amply sufficient for any ordinary-sized auditorium. Where the depth is so great that the distance from the rear seats to the speaker is over 100 feet, it is usually understood that the volume of sound is to be equally exceptional. In a grand opera house, for instance, the orchestra is rarely composed of less than eighty or one hundred pieces, and the singers are expected to have voices of corresponding calibre.

Broadly considered, an auditorium constructed along

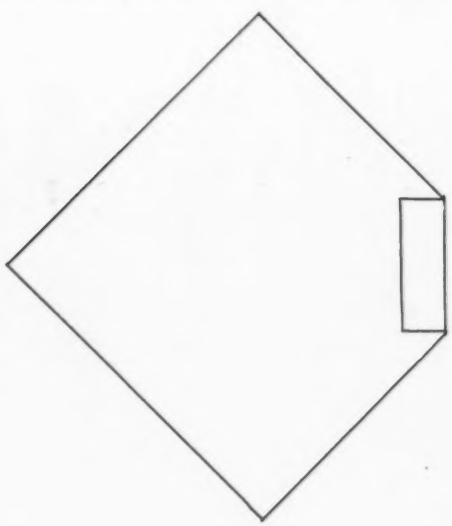


FIG. XXI

the lines above described simply amounts to a huge scientifically-shaped megaphone, so adjusted as to obviate indistinctness from interrupted reverberation and at the same time to distribute the deflected sound to the best possible advantage. There seems no obvious reason why the procedure should not be carried to its logical conclusion by cutting off the corners ZWX and WXY as shown in Fig. 20. The resulting elimination of the rear wall is in itself an excellent feature, tending largely to prevent sound-interference. Practically, such a shape appears extraordinary, but it may readily be approxi-

FIG. XXII.

mated in the case of a square auditorium by locating the rostrum in one corner, as shown in Fig. 21. This arrangement is not altogether ideal from the standpoint of either decoration or acoustics, but it often proves a valuable makeshift where conditions of economy prohibit elaboration of shape or material. It is admirably adapted to lecture halls of moderate size and unpretentious decoration, and possesses the additional advantage that the speaker commands his entire audience within an angle of 90°, and does not feel the irksome necessity of turning continually to right and left in order to address

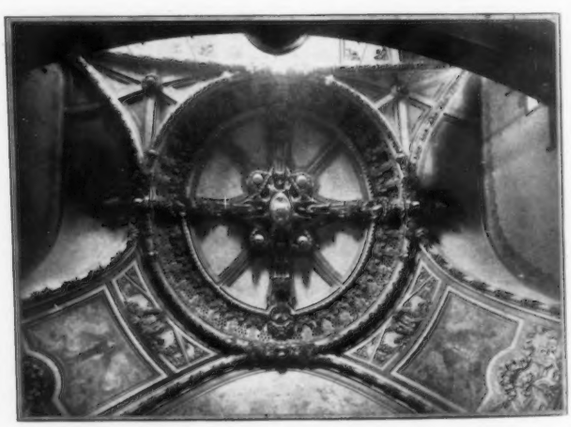


FIG. XXIII.

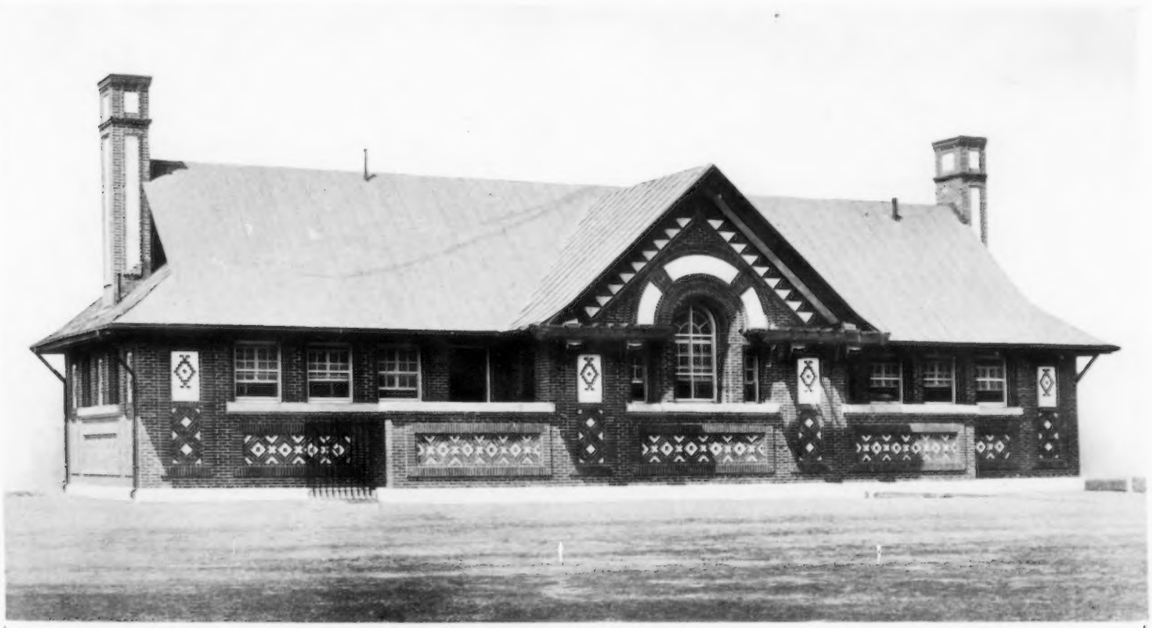
the occupants of the side seats. For larger auditoriums the shape indicated in Fig. 18 gives better acoustic results, and presents a more dignified architectural effect. The deflecting surfaces MN, OP and QR may be treated

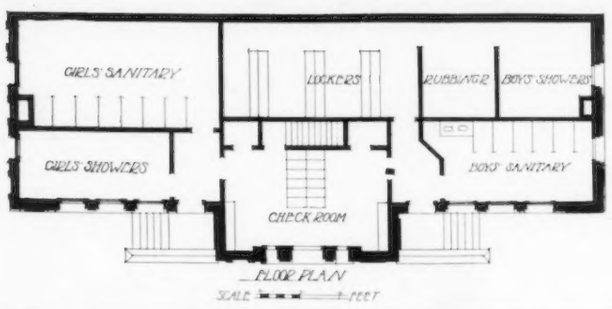
either as a conical penetration, a large niche, or as the pendentives of a shallow dome; in fact all these geometric forms may often be satisfactorily combined in a single design. In the New Amsterdam Theatre, for example, the proscenium, Fig. 22, was laid out on the principle of a cone penetrating a flattened dome. The penetration was filled in with a deflecting surface which the flattening of the dome caused to tilt inwards at the top, giving the inclination required for acoustic purposes. Two cylindrical penetrations at the sides left pendentives which when carried down to the floor, furnished deflecting surfaces corresponding very neatly to MN and OP in Fig. 18. A complete view of these deflecting surfaces as seen from below is given in Fig. 23.

New Sanitary Buildings in Boston.

THE problem of successfully designing an individual and unique sanitary building for municipal uses, one especially that is far removed from environments of natural beauty, seems to have been, up to quite recently, a matter not quite worthy of the architect's consideration, but one apparently more likely to be associated with the handiwork of the mechanically practical man whose main object appears to have been to produce a building that would answer the demands of the public from the utilitarian standpoint only. It would seem that the usually inelegant surroundings of a building of this class make it all the more vital that the building conform to the present-day conception of individual architecture. And, too, why should not the sanitary demand the same consideration of the architect as other municipal buildings — a police station, schoolhouse, or fire station?

The accompanying illustrations of buildings that have been recently completed in Boston show advancement along ideal lines and remarkable improvements over many of our previously designed buildings of this class. The buildings give decidedly pleasing results, many new features and forms being introduced in the construction,





SANITARY BUILDING

AT

COLUMBUS AVENUE PLAYGROUND,

BOSTON, MASS.

Stickney & Austin, Architects.

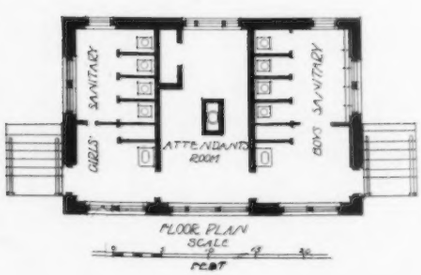
SANITARY BUILDING

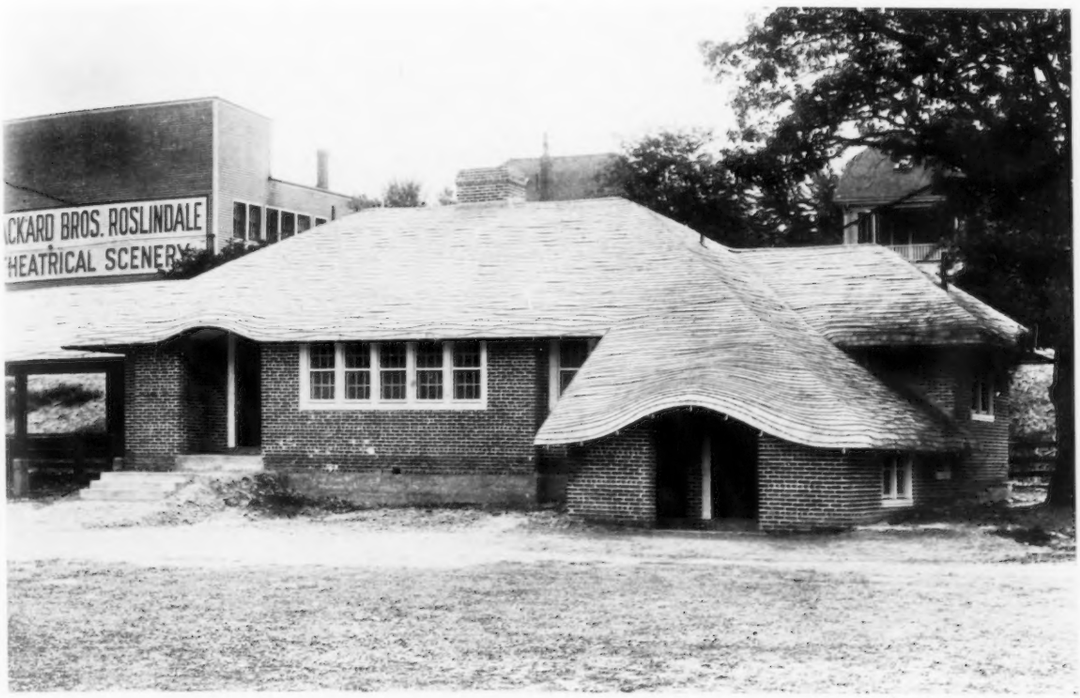
AT

ASHMONT, BOSTON, MASS.

Stickney & Austin,

Architects.





SANITARY BUILDING

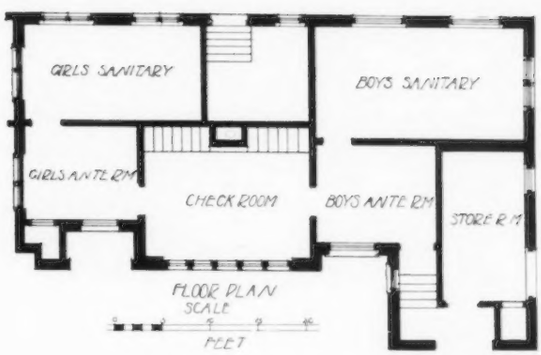
AT

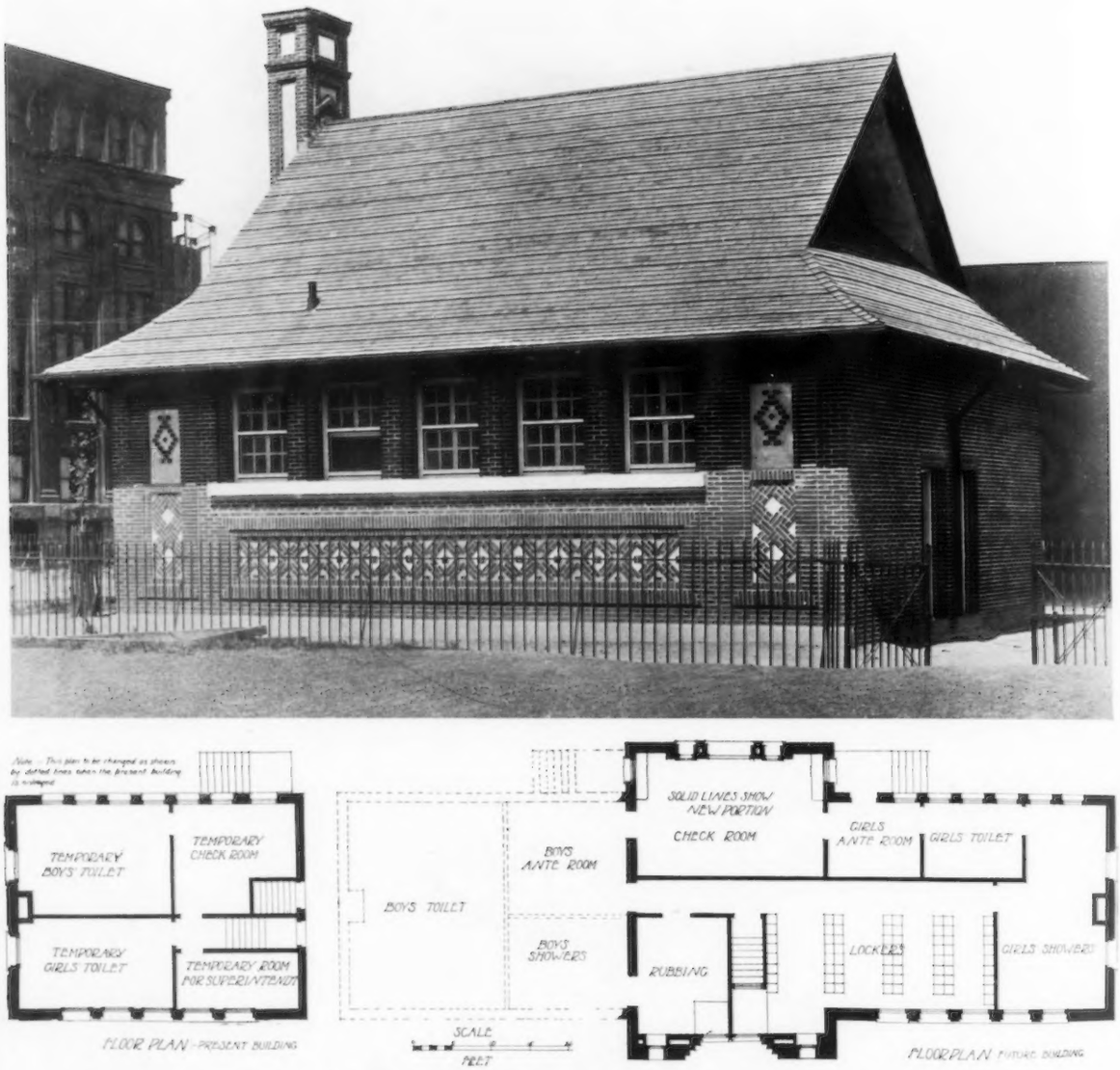
ROSLINDALE PLAYGROUND,

BOSTON, MASS.

Stickney & Austin,

Architects.





SANITARY BUILDING AT CHARLESTOWN PLAYGROUND, BOSTON, MASS.
Stickney & Austin, Architects.

chimneys, roofs, wall panels, and cleverly distributed window openings.

The Columbus Avenue building, the largest of the group, is perhaps the most successful. It has a long, low roof line, interestingly treated at either gable-hip end. On one end the brick and plaster chimney occurs. The front elevation has a large gable end bay which forms the entrance way. The gable has a good group of windows, but the semi-circular plaster arch over the windows is much too white, and has a tendency to strike a jarring note. The high brick screens on either side of the bay — hiding the entrance ways — are a decided improvement over the ordinary wood lattice affairs so commonly used.

The Sullivan Square building is much smaller and without the center bay, and has a shingle roof instead of tin. The wall treatment is similar as regards the brick patterns. The window composition is excellent.

Out in the suburban districts where a free and rambling effect seems appropriate, the architect has introduced a feature in the roofs which is a novelty in this locality. This feature, while not attempting to be an imitation, nevertheless reproduces in shingles the sentiment that is aroused by a thatched roof. The effect is obtained by ordinary boarding covered with shingles laid in uneven courses and rolled over the edges to the verge boards. The walls are laid simply and are without patterns or borders.

In these buildings the architect has achieved results esthetically good, and incidentally the total cost of each building has not been materially increased by the intrusion of this esthetic element into the problem.

Notes on Hospital Planning.

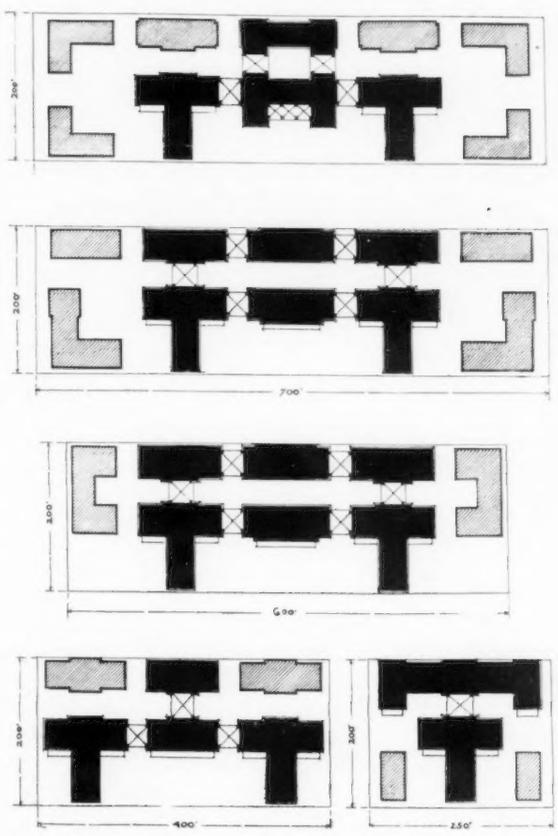
BY S. S. GOLDWATER, M.D.

Superintendent, Mount Sinai Hospital, N. Y., Consulting Supervisor of Construction to Bellevue Hospital, the Stamford Hospital, etc.

A Plan for the Construction of Ward Buildings in Crowded Cities.

AN ACCEPTABLE plan for the construction of ward buildings of many stories in crowded American cities has long been needed. Such a plan must satisfy the requirements of convenient administration, and must comply in all essentials with the demands of hygiene, even under the hard conditions of a restricted site and of possibly unfavorable surroundings. The ward plan which is the subject of this paper is presented as a contribution to the study of this problem.

It is assumed that economic necessity compels us, and will compel us indefinitely, to continue to house a majority of hospital patients in large wards. Those who are opposed to large wards and who propose to provide for each patient the particular environment best suited to his condition and needs, are no doubt correct in theory. A private room with a porch and a garden; a private nurse on day duty and another on night duty; a skilled medical officer, not too much distracted with administrative duties or with the care of other patients — all these combined represent a kind of hospital organization which is greatly to be desired, because in the long run it would yield the best results in the treatment of patients acutely ill. But the folly of subdividing wards into single rooms, while there is a lack of means to increase substantially the number of nurses, has been demonstrated to the satisfaction of more than one hospital superintendent, and to the serious discomfiture of patients in wards subdivided and understaffed.



TYPICAL BLOCK PLANS.
High buildings are solid. Low buildings are cross-hatched.

Nevertheless the necessity of a partial classification of patients within the typical medical or surgical ward group must be recognized, even if a complete and perfect classification is at present unattainable; this necessity is recognized in the accompanying ward plan, as it is in all ward plans which provide, among the appendages, a lounging and dining room for convalescents, an airing balcony or balconies, and one or more "recovery," isolating, or "quiet" rooms. The problem in ward planning is to bring together all of these helps to good nursing and proper care, in such a manner as to facilitate their supervision by the limited number of nurses at present available, and at the same time to avoid hemming in the ward itself in such a way as to interfere materially with its supply of light and air.

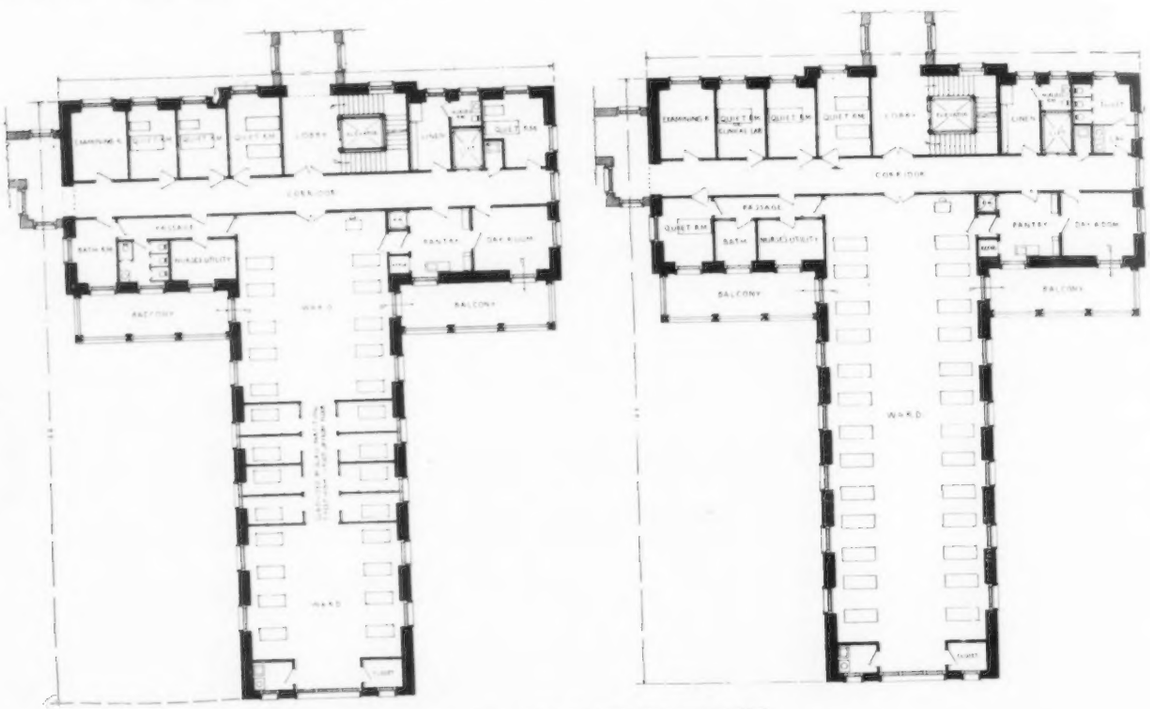
A hundred or more writers in the last decade have reviewed the history of hospital planning and have presented and commented upon the ward plans of representative hospitals in Europe and America. I shall, therefore, take for granted a knowledge of these plans and shall merely say that none of them, in my opinion — meritorious as many of them are, and admirable as some of them must be acknowledged to be — can be utilized in a wholly satisfactory way for the construction of a hospital of any considerable capacity on such sites as offer themselves, for example, on the island of Manhattan in the city of New York, where streets, running east and west, parallel each other at a distance of only 200 feet from north and south, and where most of these streets, from house-line to house-line, are only 60 feet in width. Within the limits of such a city block (and I confine myself to the rigorous demands of a typical Manhattan block, because while better sites, permitting greater freedom in planning, are often to be had in other cities, worse ones for the erection of a large general hospital cannot well be imagined), we are called upon to plan a hospital, the wards of which will be well lighted and surrounded by a suitable zone of aeration.

The modern hospital must be able to place its patients out of doors, whether in gardens or roof-wards or on loggias or balconies. Now since in crowded cities we cannot have gardens, and since roof-wards can only be utilized

for a relatively small number of patients, the principal wards must have balconies; and these must be so placed as to be sun-warmed in winter, must be accessible for both bed-patients and convalescents, must lend themselves readily to constant supervision, and must be so arranged as neither to disfigure the building nor greatly to darken the wards. Besides this, the balconies must not be too close to the street.

It is essential also, on account of the rapidly increasing hospital needs of urban communities, that the ward plan shall be one which, if utilized at first for the construction of a four or five-story building, will permit us to superimpose new wards upon the old ones without detriment to the latter; and it is essential so to locate our ward buildings with relation to the other buildings of the hospital group, that these other buildings, in their turn, may be increased in height and doubled in capacity, if necessary, would carry us beyond the prescribed limits of this pap[er]. For the present, therefore, I must content myself w[ith] calling attention to some of the important characteristi[cs] of the present plan, the comparative value of which w[ill] no doubt be made plain in the subsequent discussion [of] its merits and defects.

The use of the T-shaped ward building enables us [to] construct a full-sized ward of thirty-one beds (five [of] which are in "separation" rooms) within a space extending only 120 feet from north to south, or a ward of twenty-six beds within a space extending 106 feet from north to south. If we leave to the north of this an air-zone of 30 feet in the one case, or 44 feet in the other, there will be available for administration and service buildings, 50 feet along the line of the street which forms the northerly margin of a block extending 200 feet from north to south. If the ward appendages and main service corridor were



TYPICAL WARD PLANS FOR CHILDREN.

without any signal alteration in the hygienic character of the wards.

This is not all that is required by the conditions of our problem. If the ward buildings, fronting south, can be so placed as to face a park or an open lot, well and good; but inasmuch as such sites are not always available, and since empty lots do not always remain unoccupied, our plan must be one which will not lose much of its virtue if open ground on the opposite or south side of the street is not available, or if such open ground, present at the time of the construction of the hospital, is subsequently covered with buildings.

A detailed comparison of the plan herewith presented with others suggested as suitable for the construction of many-storied hospital buildings in crowded cities, would lead to a discussion of many complicated problems, and extended in the axis of the ward (as in the case of the typical pavilion hospitals of Germany and Great Britain), 150 to 170 feet would be required from north to south for the ward building alone, and the remainder of the 200-foot site would be of little or no use.

A study of the group plans shows that as much as sixty per cent of the total ground area of a site 200 by 200 feet, 200 by 350 feet, 200 by 500 feet, etc., may be occupied by buildings with satisfactory results.

The wards are well exposed on two long sides and one short side, east, west, and south; the balconies or loggias are ample in capacity and have the decided advantage (in this climate, at least) of southern exposure. They do not to any appreciable extent darken the wards, and they are under the eye of the nurses in the ward; furthermore, they are so subdivided that convalescent patients may

amuse themselves without restraint on one balcony, while very sick bed-patients are obtaining the benefits of fresh-air treatment, in undisturbed quiet, on the other. Each balcony is directly visible from one of the principal service rooms, namely, the pantry or the sink-room. The balconies are set back at a comfortable distance from the street.

The balcony, day-room, lavatories and water-closets designed for the use of convalescent patients are grouped about one end of the main corridor; the isolation of the very sick takes place at the opposite end of the corridor, convenient to the principal service rooms, and entirely out of the range of observation of the convalescent patients and their friends.

The stairway and elevator lobby is isolated and yet occupies an especially favorable location, directly opposite the main entrance to the ward. Visitors approaching the ward do not pass through a long service corridor, but find their way immediately to their proper destination.

The principal corridor is arranged to serve as a true cross-ventilating corridor.

The horizontal arm of the "T," running east and west, can be lengthened, and the vertical arm shortened, if desired, for the purpose of increasing the number of separation rooms and of diminishing the number of patients in the open ward.

A special modification of the typical ward plan, to meet the altered requirements of a children's service, is included among the sketches submitted. Features of this plan are the observation windows permitting the control of the children's water-closets from the nurses' utility-room; the rooms for isolated cases or for babies and wet-nurses; the glass "boxes" for semi-isolation within the large ward; the larger bathroom, to accommodate bath tub and slab.

Bridges may be carried from the ward buildings to the north, east, or west, without detriment to the wards. In a group plan including two ward buildings, a bridge to the east or west would give convenient access to a central administration building. In a group plan including but one ward building, a bridge to the north would communicate with an administration building facing the northerly street; in a larger group plan, bridges to the north would communicate, according to the details of the general scheme, with an administration building, kitchen and laundry building, pathological laboratory, operating pavilion, out-patient department, or with buildings used for any variety or combination of the purposes named. In the larger and more complete group plans a separate out-patient building, not too high, would be placed at the south-east or south-west corner of the block and would be balanced by a private patients' pavilion at the opposite corner, leaving the ward buildings well exposed.

The essential feature of the scheme herewith presented, in which it differs from any published or applied ward plan known to the writer, is the combination of ward and balcony in a T-shaped plan, which, under the common conditions of hospital construction in crowded cities, seems to offer advantages not otherwise attainable.

I am indebted to Messrs. McKim, Mead and White for kindly permitting me to have the accompanying drawings prepared in their office.

"On the Use of an Elastic Ward Unit in the Construction of Hospitals for Contagious Diseases."

A TOWN hospital for contagious diseases usually includes two separate ward units, intended respectively for the care of cases of scarlet fever and diphtheria. The ward unit as a rule is planned for both sexes, and it includes therefore at least two bedrooms for patients, together with the necessary ward appendages or service-rooms. If the "contagious" wards are on the grounds of and connected with a general hospital, the central administration buildings of the general hospital may be made to serve the contagious wards as well. If the contagious hospital is planned to be governed independently, administration buildings must be provided for it. However this may be, the problems encountered in the construction of the wards themselves are always the same, and it is with one of these problems, which hitherto has appeared to baffle the ingenuity of hospital architects and hospital administrators, that this paper proposes to deal.

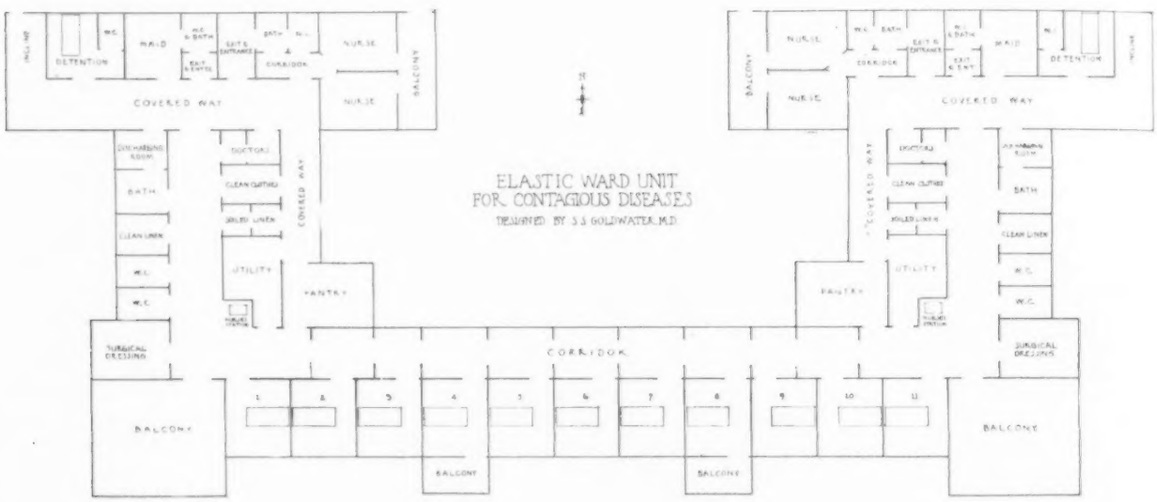
The bed capacity of a hospital ward is determined by its cubic contents; and if this is a fixed quantity, as it usually is, the normal capacity of the ward is fixed and unchangeable. Now the contagious or epidemic diseases, from their very nature, are of fluctuating frequency. In a given community the average requirement for scarlet fever and diphtheria patients together may be twenty, forty, or sixty beds, but during one month or season twice as many beds may be needed for the care of scarlet fever cases as are demanded for cases of diphtheria, while during the ensuing month or season the proportions may be reversed. Compelled to face a demand so changeable, administrators are sorely put to it to make both ends meet; and often they find themselves so circumstanced as to be obliged either to overcrowd their wards (a very dangerous procedure indeed in the case of contagious diseases), or to turn away patients in need of hospital care, even though one wing of the hospital remains partially unoccupied. Notwithstanding these conditions, the practice in the construction of wards for contagious diseases is still to provide units of fixed capacity.

It is true that in order to be prepared for emergencies towns sometimes plan their contagious wards on the scale which is necessary to meet the probable maximum demand for beds for each of the more important contagious diseases; this means that many beds are unused most of the time. The great economic waste involved in this policy has been repeatedly noticed by writers on municipal sanitation, and in at least one instance, namely, in the case of the Hospital Pasteur in Paris, it has led to the adoption of the plan of caring for a variety of contagious diseases, of whatever kind, in rooms connected with a single corridor. In this hospital the patients' rooms are small and are designed (excepting certain three-bed wards for convalescents) for the occupancy of a single patient. On each floor there is a single set of service-rooms, to be used by the nurse or nurses assigned to the care of the miscellaneous cases on the floor.

Although it is claimed by the medical directors of this hospital that nurses can be placed in charge of a variety of contagious cases, and can be so trained that there is practically no danger of the transmission of disease from one patient to another, provided the patients themselves are not allowed to come into contact with each other, neither medical nor public opinion in this country is prepared as yet to accept these claims as fully established. Even if the safety of this arrangement should be established ultimately, the method cannot be commended as one which is wholly economical from the standpoint of nursing administration, because of the great loss of time involved in the cleansing and clothes-changing process which must be followed by each nurse as she passes from one patient to another. A further objection to the method of the Hospital Pasteur is that it necessitates something akin to prison regimen for the patient, who necessarily must be confined closely to his room or cell, because if he leaves it he is sure to come into contact with patients suffering from other contagious diseases.

The method just described represents, however, a commendable effort to convert ordinary wards for contagious diseases, with their fixed capacity and frequent waste of beds, into wards of variable capacity; and it has occurred to the present writer that wards of variable capacity — an elastic ward unit, in other words, having convertible or optional bed space, can easily be designed in a manner which will entirely satisfy all reasonable demands for economy in both construction and administration, and which will accomplish this in such a way as to recognize and satisfy the prevailing demand for completely separate services for each contagious disease. Two such wards, arranged as a pair, are shown in the accompanying plan. It will be seen at a glance that the same principle can be applied to a group of three or four ward units, wherever it is thought desirable to make provision for contagious diseases in addition to scarlet fever and diphtheria.

The accompanying plan shows a series of patients' bedrooms facing south, and arranged as single rooms (rooms for two, four or six beds may be preferred by some for the sake of nursing convenience, though from a strictly sanitary standpoint, patients suffering from contagious diseases are most safely treated in single rooms). The patients' rooms open on a corridor which terminates in a large balcony east and west, and which is continuous with two service corridors, one at each end. The main corridor is so planned that it can be subdivided; and in this manner there may be joined to the service-rooms at either extremity, any desired number of patients' bedrooms, from one to ten (more if a longer series be adopted). The mode of procedure is as follows: The first scarlet fever case, let us say, is admitted to Room 1, and the corridor is closed between Rooms 1 and 2. The first diphtheria case is admitted to Room 11, the corridor being closed between Rooms 11 and 10. The rooms between 1 and 11 are uncontaminated, and are ready to be used in succession either with Room 1 or with Room 11, as the demand arises. The second scarlet fever case is placed in Room 2, the second diphtheria case in Room 10, etc.



The large balconies are sufficiently spacious to afford ample opportunity for fresh-air treatment, but are so far apart that there is no chance of contact between the two groups of patients. Some of the patients' bedrooms have individual balconies, and these rooms may be used for the accommodation of special cases, such as patients for whom strict isolation is desired for sanitary or disciplinary reasons, or private patients who may not wish to mingle with the general run of patients who will take their airings on the large balconies.

The plan illustrates in its further details many minor administrative methods, but the purpose of this paper is not to discuss these.

The elastic ward unit for contagious diseases is suggested as a means to economy in the construction and administration of hospitals for contagious diseases — a means consistent with the principles of sanitary science, and entirely practical, because not at variance with the controlling beliefs or prejudices of either the medical profession or the general public.

A Contract Between Architect and Owner.

BY WM. BROKAW BAMFORD, M. AM. SOC. C. E.

ARCHITECTS seldom enter into a written contract or agreement with owners for the work they are commissioned to undertake. This is partly due to the fact that professional men do not as a rule make written contracts with their clients.

When an oral agreement for the employment of services takes the place of a written agreement, and for any reason litigation results from such employment, oral testimony or professional custom is usually all that can be brought forward by an architect in support of his claims. In the case of lawyers and physicians much litigation and a well established code of professional practice largely offset the need for a written agreement with clients. With architects, however, their professional practices is still a subject of much diversity of opinion among themselves, and the numerous cases of litigation have served to confuse rather than to simplify professional custom.

It seems, therefore, very desirable for architects to enter into written agreements with their clients in order to clearly establish what each one agrees to do, and what they should expect of each other. Until the very admirable code of professional practice adopted at the 1909 convention of the American Institute of Architects becomes more thoroughly understood by the layman (who is a vital factor in a trial by jury), and followed by architects themselves, the written agreement should be executed between architect and client rather than trust to an oral understanding or professional custom to justify an architect's claims regarding the terms of his employment.

In offering the following agreement together with suggestions for same, the writer desires to point out the conditions which should be incorporated rather than offer a form to be used as a model for universal use.

AGREEMENT BETWEEN ARCHITECT AND OWNER.

THIS AGREEMENT, made this.....day of ..... One thousand, nine hundred and..... .....between .... hereinafter designated as the Owner and..... hereinafter designated as the Architect, for professional services in connection with a..... to be erected at..... .....; Witnesseth as follows:

.....

The owner on his part agrees:

I. *Furnish Information.* First: To furnish the architect in writing with full information covering the proposed plan, arrangement and requirements of the building together with any special features he may desire, and the approximate size and proposed cost thereof.

In order to overcome much of the uncertainty caused by an owner who gives to an architect vague or conflicting instructions of the requirements which he expects to have embodied in his drawings, it is best to have the owner confirm his final decisions in writing, after all matters have been thoroughly discussed. This will prevent many misunderstandings and petty friction, if not more serious trouble.

II. *Survey, etc.* Second: To furnish a complete and accurate survey of the property giving the grade and lines of streets and adjoining properties; the rights, restrictions, boundaries and contour of the property on which the building is to be erected; and full information relating to the sewer, water, gas and electric service.

The owner should be responsible for obtaining a correct survey of his property, giving all restrictions, etc., which must be observed. In cities especially, there are many ancient restrictions of which an owner may not be aware. If he obtains a survey, and has it guaranteed by some reliable surety company, both owner and architect will be saved from very annoying future trouble if restrictions are discovered after the building is partly or completely finished.

III. *Borings.* Third: To make all borings necessary to determine the quality of the foundations, and furnish the architect with full information relating to the same.

The nature of the material underlying the foundations will govern the character of such foundations. If this material is not known for a number of feet below the level of the footings disagreeable surprises may await both owner and architect, if, after the building has seriously settled and an examination has been made, it is found that treacherous material lies just below the firm material upon which the footings rest. The owner should, therefore, have borings made before the final drawings are completed and the contract for the work awarded to a contractor.

IV. *Specialists.* Fourth: To employ any specialists who shall be acceptable to the architect, if same are necessary in connection with the heating, ventilating, mechanical, structural, electrical, and sanitary work. Such specialists shall do their work under the direction of the architect.

Any specialists who are employed should be acceptable to the architect in conjunction with whom they are to work, otherwise men who are incompatible may be brought together by an owner, to the annoyance of all concerned.

V. *Tests.* Fifth: To employ specialists if necessary and pay all expenses for chemical and mechanical tests which may be required in connection with the work.

If any tests of materials, etc., are necessary it is advisable to have a distinct understanding regarding them. An owner will usually insist that such work is a part of an architect's services and that he should pay for any specialists necessary to do his work for him.

The architect on his part agrees:

VI. *Preliminary Studies.* First: To consult and advise with the owner and make such preliminary studies

as will acquaint the owner with the contemplated arrangement, design and construction of the building, and enable the owner to accept said preliminary studies as the basis of working drawings and specifications; and to agree with the architect upon a definite limit of cost for the building.

In order to reach some definite understanding regarding the proposed cost of the work and the final requirements of the owner, the preliminary studies are important. These should be formally accepted by the owner before an architect proceeds to make his final drawings, otherwise the architect may be put to a great expense correcting the final drawings. The owner may refuse additional compensation for such extra work, or may even decline to pay for any work, if after estimates are received from contractors it is found that the lowest bid overruns an indefinite, intangible, or absurdly low cost which the owner claims he did not wish the work to exceed.

VII. *Working Drawings.* Second: To make, upon the basis of the accepted preliminary studies, one complete set of working drawings and such detail drawings on a larger scale as are necessary to explain the working drawings and specifications.

If the working drawings are made upon the basis of an approved set of preliminary drawings, then any changes or modifications necessary can be more accurately traced to their source, and the architect under Section VIII. *Re-Study or Re-Draw Working Drawings*, would then be expected to correct only such errors or reasons for possible increases in proposed cost for which he has been responsible.

VIII. *Re-Study or Re-Draw Working Drawings.* Third: To re-study and if necessary re-draw without charge, any or all of the working drawings, if owing to an unwarranted departure from the approved preliminary studies or to a needless extravagant or elaborate interpretation of them in said drawings and specifications, the lowest bid for doing the work in accordance therewith overruns the limit of cost agreed upon by the architect and the owner.

IX. *Prints.* Fourth: To furnish for the use of the owner and contractor, ... sets of prints mounted on cloth, taken from the said set of working drawings, ... copy of all large size details and .... sets of specifications prepared for work furnished or done under his supervision. Any additional prints or specifications required by the owner or contractor shall be paid for at actual cost.

The drawings, specifications and all copies therefrom, as instruments of service, shall remain the property of the architect who reserves and retains all rights thereto, and they shall be returned to him upon the completion or discontinuance of the work.

It is advisable to definitely establish the number of sets of prints which an architect should supply to an owner or contractor free of cost. Otherwise he may find he has been shouldered with a good size expense account for prints.

X. *Building Permit.* Fifth: To make application for a building permit and deliver to the building or other local authorities such prints from the said set of working drawings and specifications as may be required by them.

The architect, on behalf of the owner, should arrange to obtain a building permit, either before or after the contract for the work is let. If this is not done the owner may try to compel a contractor to perform a contract which requires work to be done contrary to law and he may be liable for a claim for additional compensation on account of a modification in the work necessary to make it conform to law, or a claim for a right to terminate the contract and a demand for damages.

It is mutually understood and agreed:

XI. *Architect's Authority.* First: The architect shall have general direction and supervision of all work to be done under any contract for the construction of the building, including all fixtures necessary to render it fit for occupancy. By supervision of the architect (as distinguished from the continuous personal superintendence which may be secured by the employment of a clerk-of-the-works or superintendent of construction) is meant such inspection by the architect or his deputy of work in studios and shops, of the building or other work in process of erection, completion, or alteration, as he finds necessary to ascertain whether it is being executed in general conformity with his drawings, specifications or directions. The architect is authorized to reject any part of the work which does not conform to the drawings and specifications and to order its removal and reconstruction. The architect is also authorized to act in emergencies that may arise in the course of construction, to order necessary changes, and to define the intent and meaning of the drawings and specifications.

If the operations require the services of a clerk-of-the-works or superintendent of construction, the architect, with the consent of the owner, shall employ such assistance and the expense shall be borne by the owner.

This section follows the schedule for professional practice adopted by the American Institute of Architects and should be included in the agreement to prevent misunderstanding.

XII. *Variations and Extras.* Second: The architect shall have authority at his discretion to order on behalf of the owner any necessary changes or modifications to the work whether the same may or may not involve any variation in the amount of the contract. The architect shall also direct the contractor to make any changes or additions to the work ordered by the owner either verbally or in writing, and unless otherwise directed by the owner shall notify the contractor of the manner of payment as provided in Section XVIII. of the architect's standard form of *Schedule of Conditions of Contract.*

The architect shall, as soon as is reasonably possible, notify the owner in writing of any changes or modifications which he has ordered which involve a variation in the amount of the contract, and where possible the amount of such variation or the method for determining the amount of such variation as provided in Section XVIII. of the *Schedule of Conditions of Contract* above referred to.

It is also mutually understood that the owner hereby ratifies and confirms all orders or directions of the architect which may be given in connection with the work; provided, however, that the right is reserved to the owner at any time to withdraw the authority for the

architect to order changes or modifications involving a variation in the amount of the contract, by giving to both the architect and contractor written notice of his withdrawal of such authority. In such an event the architect shall issue no further orders involving any variation in the amount of the contract unless the same have been authorized in writing by the owner, and in the event of the architect's then giving any such orders or directions he shall be held personally responsible for any expense in connection with the same.

This section is a decided innovation, and the writer asks for it special study as the subject is one of vital importance to architects — the status of the architect.

The status of the architect, as agent of the owner or professional adviser, is most often called into question in connection with orders for extra work or alterations to the contract. The architect may verbally order certain work to be done or changes made, and even should such work legitimately entitle the contractor to extra compensation, he may find it hard to collect such compensation without the written order of the architect. Even with such written order there may be trouble for both architect and contractor if the owner repudiates such order as not being authorized by him, and a court of law holds the architect to be the professional adviser and not the agent of the owner, and that he had no authority to involve the owner in additional expense without his express authority. In such a contingency the contractor may find that his only chance for redress is in a suit against the architect.

There are many times when extra work or modifications to the contract should be made at once in order not to delay the work. The architect who always has his orders confirmed by the owner before issuing them to the contractor, may find the owner temporarily away or difficult to reach at once or for other reasons may consider it advisable to order such work on his own initiative without first consulting the owner. For that reason the writer advocates placing in the general conditions of the contract a section for a provisional sum for contingencies similar to the following:

"*Provisional Sum for Contingencies.* Provide the sum of $..... for extra work (over and above the provisional sums specified in the various trades), to be used as directed by the architect, or deducted wholly or in part if not directed to be used."

An architect can then legally order the work within the amount available for contingent items without waiting for an owner's confirmation. This is a very important consideration for rush work and a contingent sum provides a very practical help out of much of the difficulty.

Such a section as the above is usual in many carefully prepared British specifications. The blanket sum usually allowed for contingencies would vary from about five per cent to ten per cent of the contract amount depending on the nature of the work and the uncertainties likely to be encountered. This section would cover extra orders of the architect not otherwise protected by an owner's written confirmation, and would assist in expediting the work and help to straighten out the analogous position of the architect in issuing orders direct to a contractor.

The money for contingent items would be spent as the architect directs and the following section should be given in the conditions of contract to cover such cases:

"*Provisional Sums.* The provisional sums mentioned in the specification for materials to be supplied or for work to be performed by special contractors or mechanics or for other works or fittings to the building, shall be paid and expended at such times and in such amounts and to and in favor of such persons as the architect shall direct, and sums thus expended shall be payable by the contractor without deductions or discount, or (without prejudice to any rights of the contractor existing under the contract referred to in Section .....) by the owner to the said contractors or mechanics. The value of works which are executed by the contractor in respect to provisional sums, or in additional works, shall be ascertained as provided by Section..... At the settlement of accounts the amount paid by the contractor to the said contractors and mechanics, and the said value of such works executed by the contractor, shall be set against all provisional sums or any sum provided for additional works, while the balance after allowing *pro rata* for the contractor's profits at the rate of . . . per cent, unless different rates are contained in the contractor's original estimate, shall be added to or deducted from the contract sum provided that in estimating the amounts paid as last herein provided no deductions shall be made by or on behalf of the owner in respect of any damages paid by the sub-contractor to the contractor, the intention being that the contractor and not the owner shall have the benefit of any such damages."

To carry the question a little further towards a legal solution the writer considers that for certain cases it might be advisable to insert the section hereinafter given in a contract between the architect and owner.

XIII. *Certificates.* Third: The architect shall make recommendations concerning all estimates and allowances of the contractor for payments under any contract, and issue a certificate to the contractor for the amount he considers due him.

No certificate of the architect shall of itself be considered conclusive evidence as to the sufficiency of any work or materials to which it relates so as to relieve the contractor from his liability to execute the works in all respects in accordance with the terms and upon and subject to the conditions of the building contract or from his liability to make good all defects as provided thereby.

This is rather an innocent looking section but it relates to a subject which has been the source of loss of considerable sums of money by architects in Great Britain. In many cases damages have been recovered from architects because they issued certificates to contractors for work which later was found to be defective. It was claimed that those certificates actually warranted that the work paid for was properly completed. When the contract between the owner and contractor did not provide for legal recovery against a contractor, the architect has been held financially responsible.

In a uniform form of agreement and conditions of contract prepared by the writer the following is inserted to overcome the legal difficulty:

"No certificate of the architect shall of itself be considered conclusive evidence as to the sufficiency of any work or materials to which it relates so as to relieve the contractor from his liability to execute the works in all respects in accordance with the terms and upon and subject to the conditions of this agreement, or from his liability to make good all defects as provided thereby."

XIV. *Changes in Work.* Fourth: The architect shall advise with the owner on any work or changes in the

building contemplated by the owner, and the owner shall order through the architect all work or changes required by him.

Such a section is desirable to establish the fact that an owner should not order the contractor to make changes or modifications, but such orders should be given by the owner to the architect and from him to a contractor. This seems obvious but too often it is not understood or followed by an owner.

XV. *Payments.* Fifth: The owner shall pay all necessary traveling expenses of the architect and as full compensation for the services aforesaid shall pay the architect..... per cent upon the total cost of the building and other work, including all fixtures necessary to render it fit for occupation. The total cost of the building shall be interpreted as the cost of all materials and all labor necessary to complete the work, plus the contractor's profit and expenses, as such costs would be if all materials were new and all labor fully paid at market prices current when the work was ordered. Payments shall be made as follows: Upon completion of preliminary sketches one-fifth (1/5) of the entire fee; upon the completion of specifications and general working drawings (exclusive of details), two-fifths (2/5) additional, and thereafter..... per cent of the amount which the architect shall certify is due the contractor. The final payment shall be however an amount sufficient to make the total payments equal the full amount due the architect. Until an actual estimate is received, the architect's charges shall be based upon the proposed cost of the work, and payments shall be made on account of the entire fee.

In case of the abandonment or suspension of the work, the owner shall upon demand of the architect pay the architect as follows: For preliminary studies, a fee in accordance with the character and magnitude of the work; for preliminary studies, specifications and general working drawings (exclusive of details), three-fifths (3/5) of the fee for complete services.

This section follows the procedure adopted by the American Institute of Architects.

XVI. *Payment for Variations.* Sixth: When for any reason other than those stated under architect's agreements, Section VIII. above, the owner shall request the architect to make alterations or modifications to the approved studies, drawings or specifications, or request him to prepare studies, drawings or specifications for work not included in the approved studies, etc., for the building, the owner shall pay to the architect if such work is constructed..... per cent of the total cost, and if such work is not constructed he shall pay in proportion to the importance of the work done and service rendered.

When for any reason the owner shall vary the amount of any contract by accepting a credit for the omission or modification of any work, the owner shall pay the architect the full commission on the work, the same as if it had been executed.

In many respects this section may appear to many to be a novel provision. It would certainly be novel for many architects if they should receive compensation for the work covered by this section. Claims for such extra work on the part of the architect are legally difficult, if not impossible, to collect without a written agreement. This clause, therefore, will undoubtedly be studied and probably indorsed in principle by a goodly number of architects.

XVII. *"Building" Defined.* Seventh: It is further mutually understood and agreed that in the above agreement the term "building" is used to define not only the structure itself, but all work in connection with it committed to the architect by the owner such as fencing, grading, roads, walks, planting, decorative painting and sculptural decoration.

A definition of the word "building" will prevent misunderstanding in many cases regarding payment to the architect for work which is not always included in the allowance for an architect's services.

In Witness Whereof, the parties to these presents have interchangeably set their hands and seals the day and year above written.

Signed, Sealed and Delivered
in the presence of: .....

In conclusion, the writer trusts that the preceding suggested forms of agreement may indicate ways in which architects can obviate much of the unnecessary misunderstanding between themselves and their clients.

Plate Illustrations—Description.

Tuberculosis Hospital, Washington, D.C. Plate 115. This hospital for the District of Columbia is situated upon a high and rolling plot of thirty acres, about three miles to the northward of the White House. The ground was purchased by Congress for a large general hospital with contagious and tuberculosis departments. Up to the present time this is the only one of the forty buildings originally intended that has been constructed. The services, such as nurses' home, domestic service building, etc., which were originally planned in separate buildings, have had to be accommodated in the present instance under one roof. The interest of the building lies in the four open wards, one of which is found over each of the three wings and one upon the fourth floor over the central building. Each ward is provided with its own dressing room, roofed in and amply protected on the exposed sides. The idea of these covered roof spaces used in lieu of the usual slightly constructed open-air wards upon the ground has proven very satisfactory, both to the management and to the patients, and was suggested by Dr. Geo. M. Kober, Washington, D. C., chairman of the commission in charge of construction. A fact which considerably complicated the planning of the building was the necessity of making provision not only for the usual divisions of incipient and advanced cases in the male and female wards, but also the separation of the

white and colored. This gave rise to the eight divisions shown upon the plan, such as incipient white male cases, advanced white male cases, etc. The appropriation was not sufficient for the number of beds called for, and so it was impossible to erect the building of fireproof construction. But by pursuing every possible economy the building was constructed for the low cost of $900 per patient, which price included all but movable equipment.

The Lawrence Hospital, Bronxville, N.Y. Plate 116. This building was planned to meet the needs of a growing suburban community. It was designed to appear a completed structure externally, and still permit of future additions, which led to the adoption of the pavilion type. In order to accommodate both surgical and medical cases a large number of private rooms were planned, while its public character required wards for both men and women. The public wards are located in the so-called ward wings temporarily and will later be permanently housed in ward buildings connected with the ward wings and constructed at right angles with their main axes. The isolation ward is some distance to the rear of the administration building, and the nurses' home is within easy access to all. The building is semi-fireproof in construction. The exterior is faced in gray pressed brick with marble and dull white glazed terra cotta trim. The interior finish is of the simplest and most sanitary character, the trim being of oak. The operating rooms, baths and toilets have tiled floors and wainscots. Flush panel doors are installed throughout. The electric equipment is complete with extensive call and intercommunicating telephone system between all rooms.

GATEWAY IN GARDEN, HOUSE AT OYSTER BAY, LONG ISLAND, N. Y.
Carrère & Hastings, Architects.

Rufus Frost Hospital, Chelsea, Mass. Plate 117. This building covers an area of about 6,000 square feet. The material upon the exterior is "Tapestry" brick with trimmings of cast limestone. The general tone of the brick is dark red, laid in Flemish bond with a white joint. The administration building is three stories high on the front and four stories on the rear, with wings on either side, which in turn are two stories on the front and three on the rear. Upon the interior each floor is provided with a diet kitchen, also a toilet and bathroom for each sex. The third floor is devoted entirely to nurses' sleeping apartments, being individual rooms with a general bath. The entire building is finished in ash and hard plaster. Monolith floors have been used in the operating, surgeons', and sterilizing rooms, as well as baths. A glazed solarium and open porch has been furnished for convalescents. A convalescence exit from the sun porch to the lawns has been provided, the same being of an easy grade, doing away with steps. The building is equipped with elevators and stand-pipe for fire protection. The cost of the building was $56,449.46.

House and Garden at Oyster Bay, Long Island, N. Y. Plates 119, 120, 121, 122, 123, 124. The first house in America to be constructed of brick similar in size and texture to many of those used in ancient Rome is shown in the plate illustrations of the house at Oyster Bay, L. I., Carrère & Hastings, architects. This house marks an epoch, in many respects, in the development of artistic brickwork in this country.

The brick are most unusual in size, being 18 inches long, 2 inches thick and 6 inches wide. They vary in color from a rich red to a deep blue with many intermediate shades of light and dark brown, purple and olive. Many of the individual brick bear several colors each and all have rough, rugged surfaces. They are laid in Flemish bond with a 1 inch cream-gray, rough textured mortar joint. So skilfully have these brick been woven together that one loses all sense of a wide variety of color and sees before him only a rich, dark fabric-like wall possessing a delightful texture, yet an extreme softness, perfect harmony and simple dignity.

In appropriate parts of the work patterns have been introduced by the use, as in the gables, of the Dutch cross bond with its diagonal lined mortar joints; by simple belt courses of headers and interesting "herring-bone" patterns, as in the stair tower; by ornamental spandrels over the loggia arches and by the use, as a frieze, of some forty mosaic panels; in all of this work a sufficient amount of soft brownish-gray brick and tile has been used to properly bring out the patterns.

Perhaps the best single word expressive of this brickwork would be "harmony"; it fits its environment. One has the feeling that the house is "at home" among the trees and the flowers of the wonderful old-new garden. There is no jarring note in the blending colors of the brick any more than among the flowers themselves — in fact the house seems to have grown up among them.

These illustrations are of great interest as they exemplify the rapidly increasing use of brick for country house work in America — the adaptation to our needs of the charming old brick house of rural England.

Editorial Comment and Miscellany.

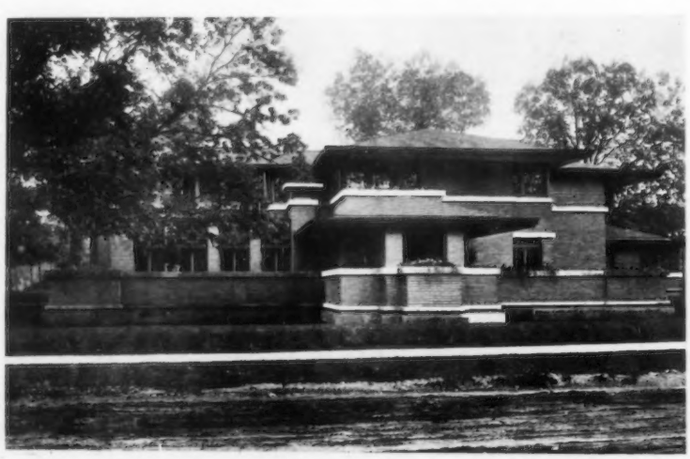
REPORT OF PARISIAN FLOOD COMMISSION.

THE commission that was appointed to investigate measures necessary to prevent a recurrence of the disastrous floods in Paris has submitted its report. It provides for the widening of the Seine above Port St. Michel, the reconstruction of the Archeveche, Double and Petit Pont Bridges, the displacement of the Orleans railway, the modification of the Monnaie barrage and lock, the raising of the embankment walls 50 cm. above the water level of 1910, and the adoption of suitable means for hermetically closing the openings into the Seine. While these suggestions are intended to protect the railways and public works, and prevent the Seine from overflowing the embankments, a still more important undertaking is proposed for relieving the Seine in its passage through Paris. This is to be done by widening the left arm of the Seine on the right of the Ile de la Cite, at an estimated cost of 12,000,000 francs; the deepening of the bed of the river between Suresnes and Bougival, at an estimated cost of 30,000,000 francs; and the construction of a canal from Annette on the Marne, to Epinay on the Seine, at an approximate cost of 170,000,000 francs.

DETAIL FOR CHURCH.
Made by Conkling-Armstrong Terra Cotta Company.
F. Joseph Untersee, Architect.

COMPETITION.

THE Building Trades Employers' Association of New York City is conducting a competition in connection with its permanent exhibition of building materials. The program calls for two houses, one of four rooms costing $2,500, and another of eight rooms costing $4,500. The competition divides itself into two classes; in the first class, or $2,500 house, the three best drawings will be awarded prizes of $100, $50 and $30 respectively, while a like number of drawings in the second class will receive $150, $75 and $50. In addition to the six prizes mentioned, three drawings in both classes receiving honorable mention will be awarded $20 each. Designs are solicited from all architects and architectural draftsmen. At the close of the competition, December 1, 1910, models will be made from the winning designs and given a permanent place in the exhibition department. The committee to judge the drawings will be William A. Boring, Donn Barber and Grosvenor Atterbury. The program of the competition, with full terms, may be obtained from the Association at 34 West 33d street, New York City.



HOUSE AT GRAND RAPIDS, MICH.
Built of light gray "Astrakhan" rough faced brick, made by Columbus Brick and Terra Cotta Company, F. H. McDonald, Agent.
Frank Lloyd Wright, Architect.

MOVING A STRAIGHT BRICK WALL.

THE setting of a larger paper machine in the Watervliet, Mich., paper mill, necessitated the relocating of one of the brick foundation walls of the old machine, 150 feet long, 16 feet high and 21 inches thick, which was composed of a succession of 3-foot piers, 8 feet on centers, arched over with a 42-inch crown. The new machine was 23 inches wider than the old, and the paper company intended to tear down one of the brick foundation walls and rebuild it in proper location to accommodate the new machine. This would have involved an expense of about $1,000. It was suggested by the contractors, who were reconstructing a considerable portion of the interior of the mill, that new footings be built and the wall moved 23 inches to one side. This plan was adopted by the paper company when the price for the work agreed upon was less than half the cost of tearing down and rebuilding. — *Engineering Record.*

AN ENGLISH VIEW OF TOWN PLANNING.

A. R. DAVIDGE, F.S.I., England, in an elaborate discussion of Town Planning gave expression to the following points: Each town must have an individuality of its own; natural assets — such as hills, wood and water — must be preserved and extended; main lines of route must take direction required by traffic and contour of ground; geometrical planning must not necessarily be adopted as satisfactory; long, straight streets when adopted should have a definite "motive"; slight curves or irregularities in frontage lines may in many cases be adopted with advantage; line of sight

should in most cases be restricted within reasonable limits — i e., lines of long streets except as mentioned above should be broken and all views should as far as possible be framed in a suitable setting; the grouping or arrangement of the principal buildings and open spaces should in all cases be specially studied with a view to securing the best effect for the whole; no planning scheme can be considered as complete without a sufficiency of open spaces, and due regard must be paid to proportion and to architectural design.

TWO METHODS FOR SOUND-PROOFING HOUSES.

ONE of the chambers of the Amsterdam Royal Academy of Science has been made noise-proof in the following manner: The walls of the room consist of six layers, alternately of wood, cork and sand. There are two spaces, one between the second and the third layer, and one between the fourth and the fifth, from which the air has been extracted. The inner walls are of porous stone covered with a kind of horsehair cloth known as trichopiese, a Belgian invention, which is sound-resisting and is widely used in Belgium in telephone booths. The walls are pierced by acoustically isolated leaden rods. The roof is composed of layers of lead, wood, asphalt, paper, seagrass and cork. The second method, which is cheaper, is suitable for apartments. It consists of sheathing the partition studs with tin or aluminum. This idea is of German origin and was used first in lining wooden telephone booths.

DETAIL FOR SCOTTISH RITE CATHEDRAL.
Winkle Terra Cotta Company, Makers.
Jones & Furbringer, Architects.

CATHEDRAL AT WESTMINSTER.

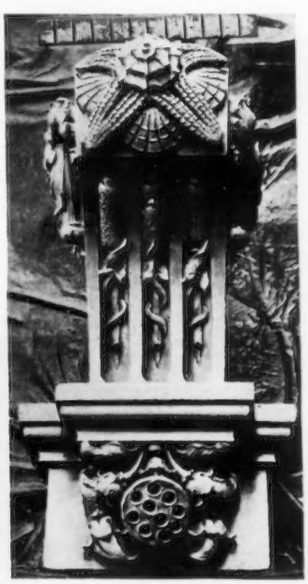
THE great cathedral at Westminster, England, which was recently consecrated, is considered by many to be the "most original building of modern times." It is built in the early Christian Byzantine style. The interior is adorned with the mosaics with which it is proposed to cover all the walls similar to those of St. Mark's in Venice. The cost, exclusive of the site, was $1,500,000. The dimensions of the cathedral are as follows: Exterior — extreme length 360 feet, width 156 feet, height of nave 117 feet, height of campanile (St. Edward's Tower) 273 feet, and to the top of the cross 284 feet; interior — length 342 feet, width of nave with aisles 98 feet, height of main arches of nave 90 feet, and of the domes 112 feet. The area of the whole building is 54,000 square feet.

HOUSE AT GRAND RAPIDS, MICH.
Faced with "Ironclay" brick, made by Ironclay Brick Company.
Williamson & Crow, Architects.

ARTIFICIAL LIGHTING FOR SCHOOLHOUSES.

A SERIES of tests was recently conducted for the Board of Education of Newark to determine the best form of lighting for schoolrooms. The rooms in which the experiments were tried measured 22 by 34 feet, and were 12 feet high. Three systems were tried, consisting of twenty-two 16-candlepower

DETAILS FOR FILTER PLANT BUILDING, PHILADELPHIA.
Executed in terra cotta
by
Atlantic Terra Cotta Company.



lamps, five 75-candlepower graphitized filament lamps, and five 100-watt tungsten lamps with glass reflectors and frosted tips. The tungsten lamps were the most economical and gave by far the best light at each desk, as was determined by illuminometer readings. A similar investigation has been made in Boston, where it was suggested that the room be lighted by lamps placed along the side walls just under the ceiling in boxes with prismatic glass bottoms, which would cast the rays into the room at the desired angle.—*Scientific American.*

EIFFEL TOWER.

THE Eiffel Tower, Paris, which is 300 meters high, has been observed by scientists to contract during the day and expand during the night. They attribute this to the effect of the sun upon the iron with which it is constructed. In summer the tower twists itself in such a manner that by sundown the lightning rod at the top leans eastward. In the winter it points westward. By dawn next day the rod is vertical again. The tip of the lightning rod leans from the plumb-line, a distance of from about 1½ inches to as much as 8 inches. Recent observations have shown that the tower's habit of twisting in different directions does not increase with age and there seems, therefore, no danger of its falling.

DETAIL OF APARTMENT HOUSE, RIVERSIDE DRIVE, NEW YORK CITY.
Executed in white mat terra cotta by New York Architectural Terra Cotta Company.
G. Ajello, Architect.

CONSTRUCTION OF EXHIBITION BUILDINGS.

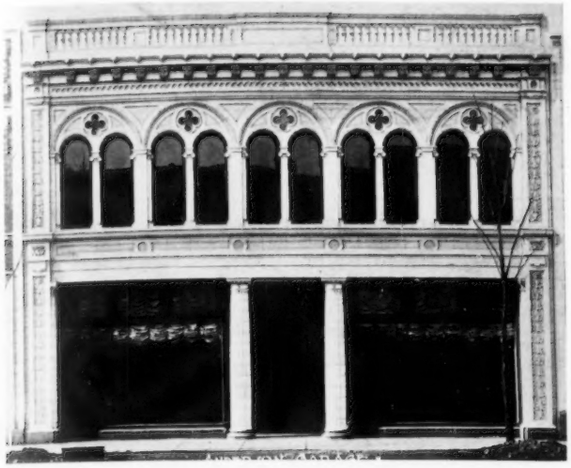
THE recent destruction of art treasures by fire at the International Exhibition at Brussels will undoubtedly act as an incentive to a better class of buildings in the future. In fact, fireproof construction will be necessary for housing works of art if exhibitors expect to secure valuable material from the various countries. Already a motion has been introduced by a Paris municipal councilor forbidding the city of Paris to lend a work of art under any circumstances. The Lille Museum is considering a similar rule. Such action will become universal unless absolute protection is assured to all donors.

BUILDING OPERATIONS FOR AUGUST.

THE statistics as compiled by *The American Contractor*, New York, show a gain in twenty-five cities of from 3 per cent to 199 per cent; others showing a loss of from 3 to 69 per cent. Cities scoring a gain over 50 per cent are: Baltimore, 158; Birmingham, 85; Columbus, 123; Louisville, 114; Manchester, 59; Nashville, 199; New Haven, 89; Portland, Ore., 156; Toledo, 84. The United States Steel Corporation is to build a branch plant at Duluth and has taken out a permit to erect the first forty-eight buildings at an estimated cost of $10,000,000.

A NEW office building has been designed by D. H. Burnham & Co., architects, for the People's Gas Light & Coke Company, Chicago, Ill. This building will be twenty-one stories high, having a frontage of 196 feet on Michigan avenue and 172 feet on Adams street. It will accommodate fifteen hundred offices and cost approximately $6,000,000 when finished. The exterior will be of granite and glazed terra cotta. The two main façades will have a colonnade of eighteen monolithic columns, each of which will be 4 feet 3 inches in diameter and 26 feet 6 inches in height, weighing thirty tons. The building will be absolutely fireproof.

COLUMBIA UNIVERSITY announces a course of lectures by Edward R. Smith, Reference Librarian, Avery Library. This course will cover the entire development of the fine arts among European peoples. The history of art will be shown not so much in the succession of monuments as in the development of style. The



ANDERSON GARAGE, CHICAGO, ILL.
Of white enameled terra cotta furnished by the Northwestern Terra Cotta Company.
Jenney, Mundie & Jensen, Architects.

course is intended to be entirely simple and elementary, giving the general information on the history of art, which should precede special and critical study. There will be thirty sessions beginning October 8th.

THE scholarships of the Architectural League of America in Harvard University have been awarded to Robert Finn and Henry Jansen of Detroit, and Frederick Larsen of Boston, with Ernest Hayward of Somerville, Mass., as alternate. Thirteen drawings in all were submitted in the final competition. The teaching staff of the Department of Architecture of Harvard University and Edmund Wheelwright of Boston formed the committee of award.

NEW BOOKS.

ITALIAN BRICK ARCHITECTURE OF THE MIDDLE AGES AND THE RENAISSANCE. A new book by H. Strack. 47 plates size 14½ x 20. Price portfolio, $8. Bound, $11. New York, William Helburn.

A PRIMER OF ARCHITECTURAL DRAWING — for young students. Twenty-five problems, each illustrated by a plate. One hundred and sixty-one explanatory detail figures, 154 pages. Pocket size, by Wm. S. B. Dana, B.S. (Massachusetts Institute of Technology). Cloth, price $1.25. New York: William T. Comstock.

COTTAGE FOR PARENTAL SCHOOL, MAYFAIR, ILL.
Roofed with interlocking shingle tile made by Ludowici-Celadon Company.
W. B. Mundie, Architect.

IN GENERAL.

Lyman A. Ford and Leslie Allen Oliver, formerly of the architectural firm of Ford, Stewart & Oliver, have formed a co-partnership with Lawrence Smith Butler for the practice of architecture under the firm name of Ford, Butler & Oliver. Offices: 103 Park avenue, New York City.

DETAIL BY E. F. GUILBERT, ARCHITECT.
South Amboy Terra Cotta Company, Makers.

Elmo Cameron Lowe and J. Carlisle Bollenbacher have formed a co-partnership for the practice of architecture, with offices at 1612 Corn Exchange Bank Building, Chicago.

Luther Morris Leisenring has opened offices for the practice of architecture at 1320 New York avenue, N. W., Washington, D.C.

Henry Auerbach has opened offices for the practice of architectural engineering at 90 West street, New York City. Manufacturers' catalogues and samples solicited.

D. H. Perkins and J. L. Hamilton, architects, have removed to their new suite, 1100 Straus Building, 132 Clark street, Chicago.

Frank C. Walter, formerly of the architectural firm of Edwards & Walter, has established offices for the practice of architecture at 502 3 Forsyth Building, Atlanta, Ga.

Richard H. Marr announces that he has opened an office at 1529 Ford Building, Detroit, for the practice of architecture.

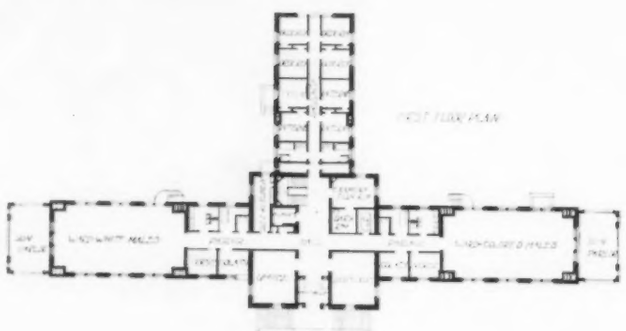
The "Tapestry" brick for the house at Oyster Bay, Long Island, illustrated in this issue, was furnished by Fiske & Co., Inc.

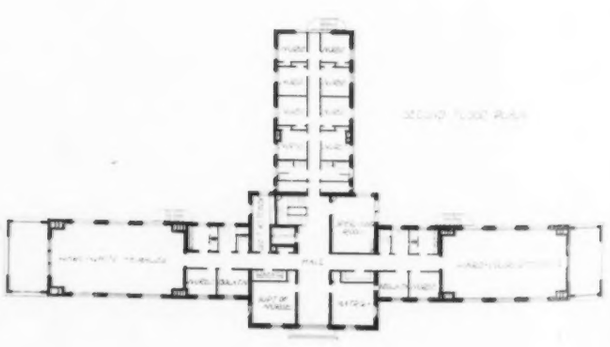
A Town Planning Conference will be held in London from October 10 to 15, 1910, under the auspices of The Royal Institute of British Architects.

The restoration of the Palace of the Popes at Avignon is steadily proceeding, and numerous interesting archæological discoveries are being made. The apartment called the "Salle des Audiences" is now completely restored, and in the chapel the stained glass which was

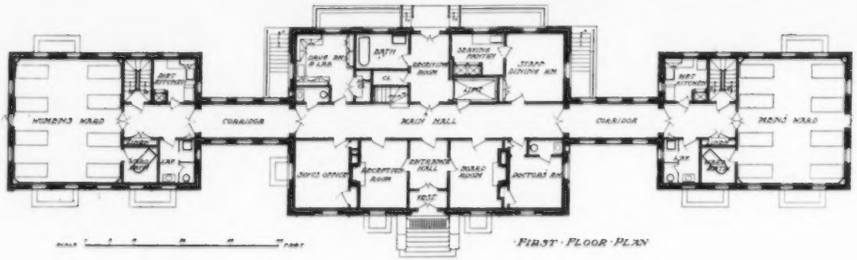
DETAIL BY T. H. POOLE & CO., ARCHITECTS.
New Jersey Terra Cotta Company, Makers.

destroyed during the occupation of the building as a barracks has been replaced according to its original design. The municipality of Avignon is occupied with the restoration of the ancient battlements extending along the bank of the Rhone between Porte Saint-Dominique and Porte de l'Oulle.





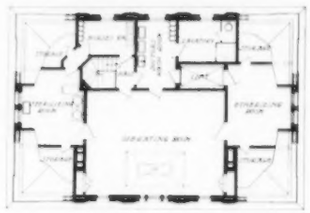
TUBERCULOSIS HOSPITAL, WASHINGTON, D. C.
FRANK MILES DAY & BROTHER, ARCHITECTS.



FIRST FLOOR PLAN

THE LAWRENCE HOSPITAL,
BRONXVILLE, N. Y.

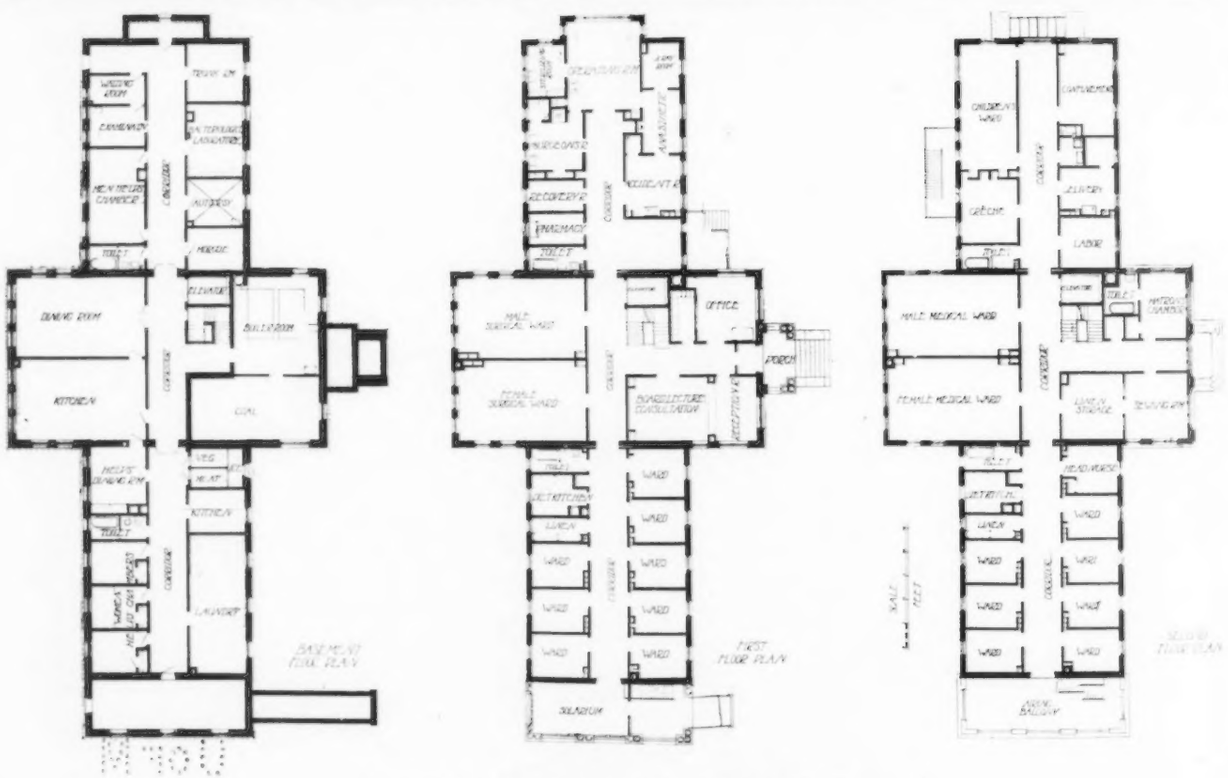
WILDER & WHITE,
ARCHITECTS.



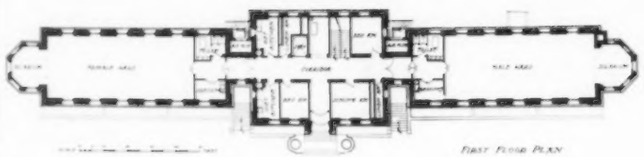
THIRD FLOOR PLAN

BASEMENT PLAN

SECOND FLOOR PLAN



RUFUS S. FROST HOSPITAL, CHELSEA, MASS.
WILLIAM HART TAYLOR & SON, ARCHITECTS.



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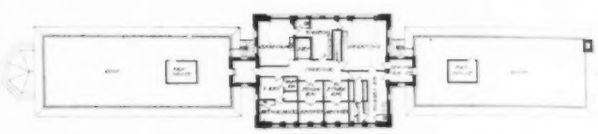
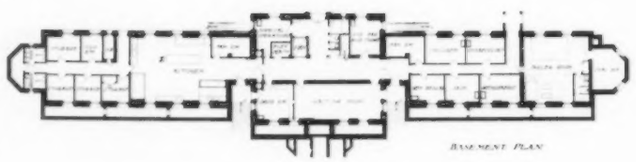


FOURTH FLOOR PLAN



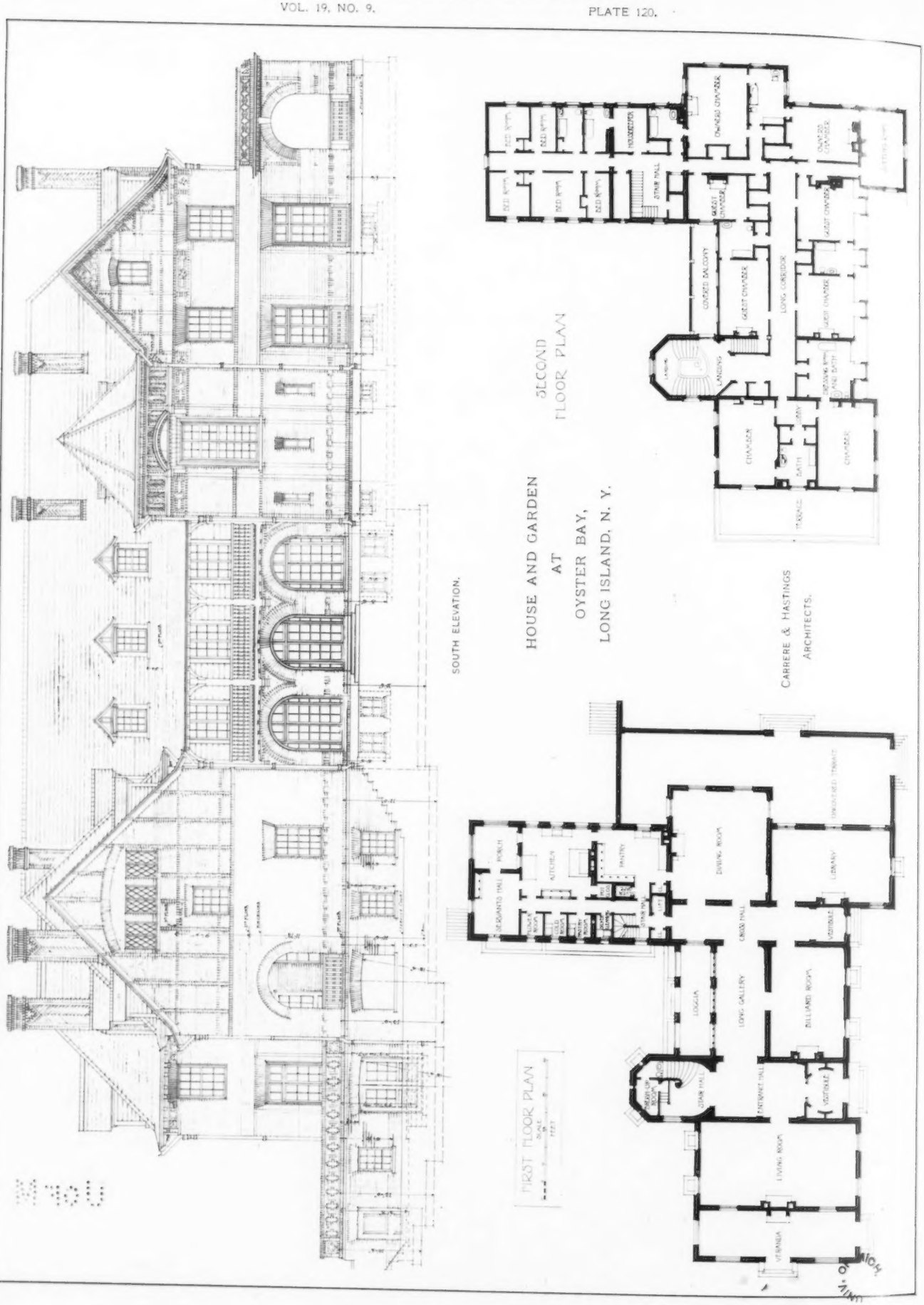
BASEMENT PLAN

SECOND AND THIRD FLOOR PLAN

THE JERSEY CITY HOSPITAL, JERSEY CITY, N. J.

CLINTON & RUSSELL, ARCHITECTS.

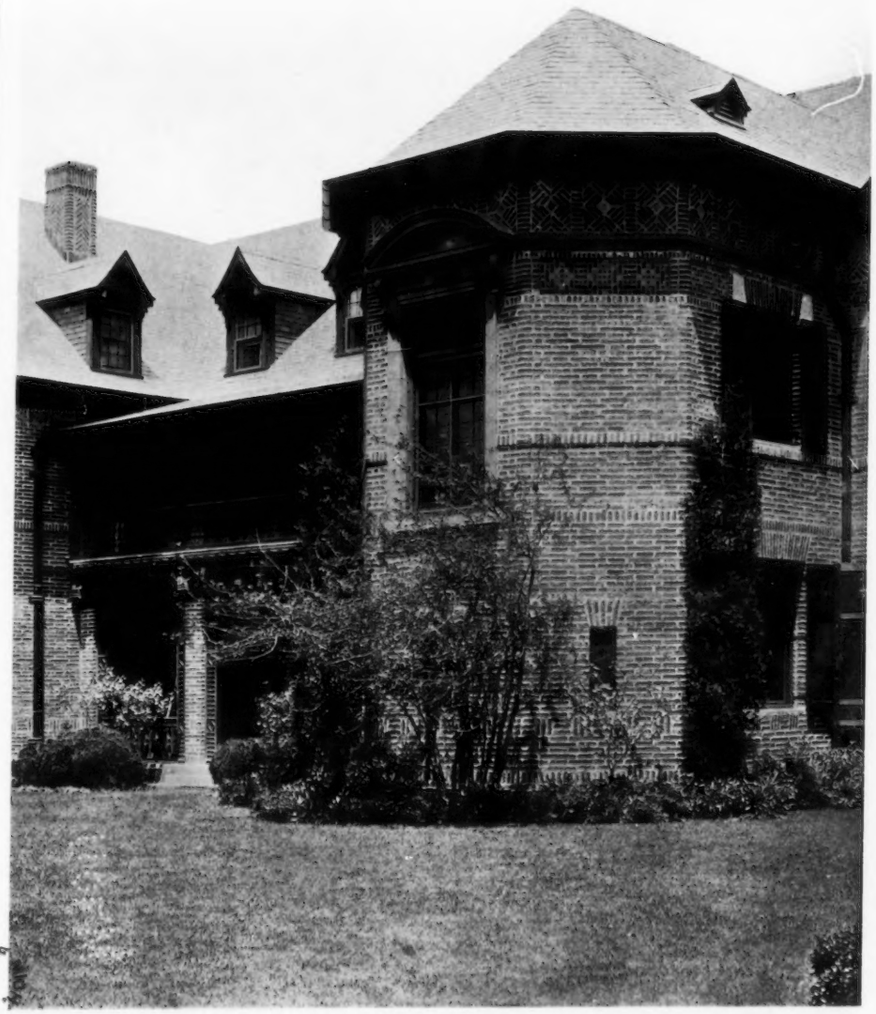
HOUSE AND GARDEN AT OYSTER BAY, LONG ISLAND, N. Y.
CARRERE & HASTINGS, ARCHITECTS.


SOUTH ELEVATION.
SECOND FLOOR PLAN
HOUSE AND GARDEN
AT
OYSTER BAY,
LONG ISLAND, N. Y.
CARRERE & HASTINGS
ARCHITECTS.
FIRST FLOOR PLAN

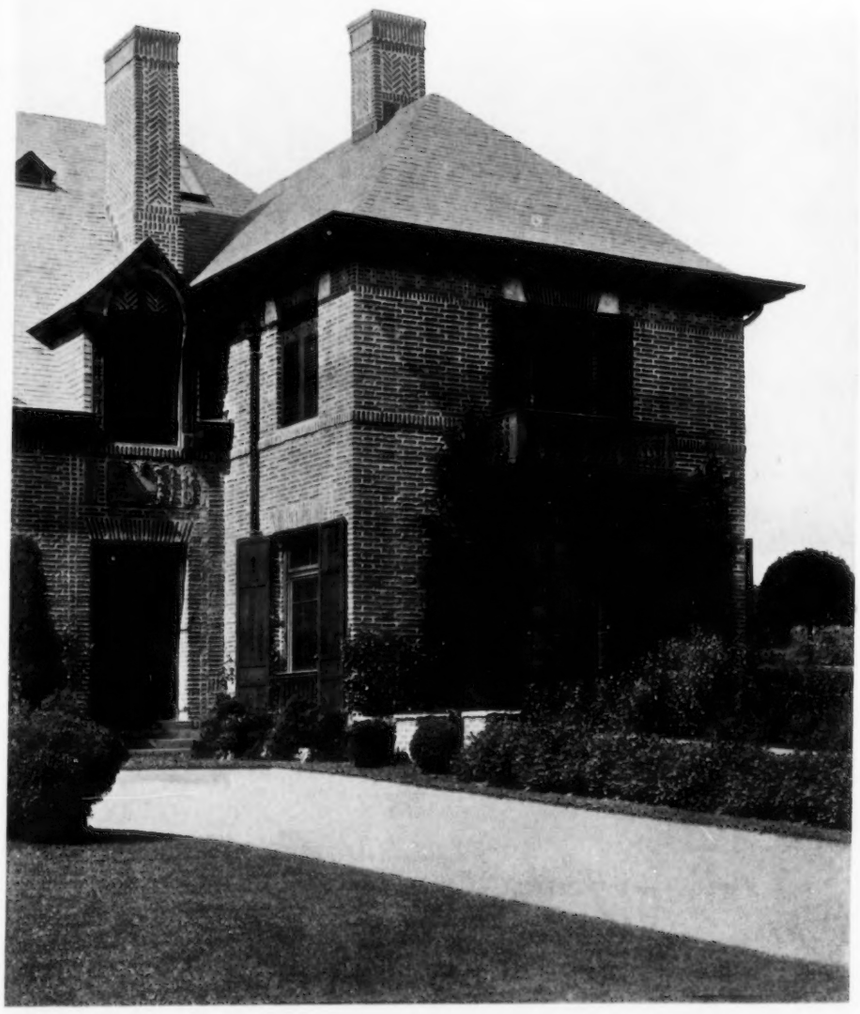
HOUSE AND GARDEN AT OYSTER BAY, LONG ISLAND, N. Y.
CARRÈRE & HASTINGS, ARCHITECTS.

DETAIL OF LOGGIA OVERLOOKING GARDEN.

HOUSE AND GARDEN AT OYSTER BAY, LONG ISLAND, N. Y.
CARRÈRE & HASTINGS, ARCHITECTS.



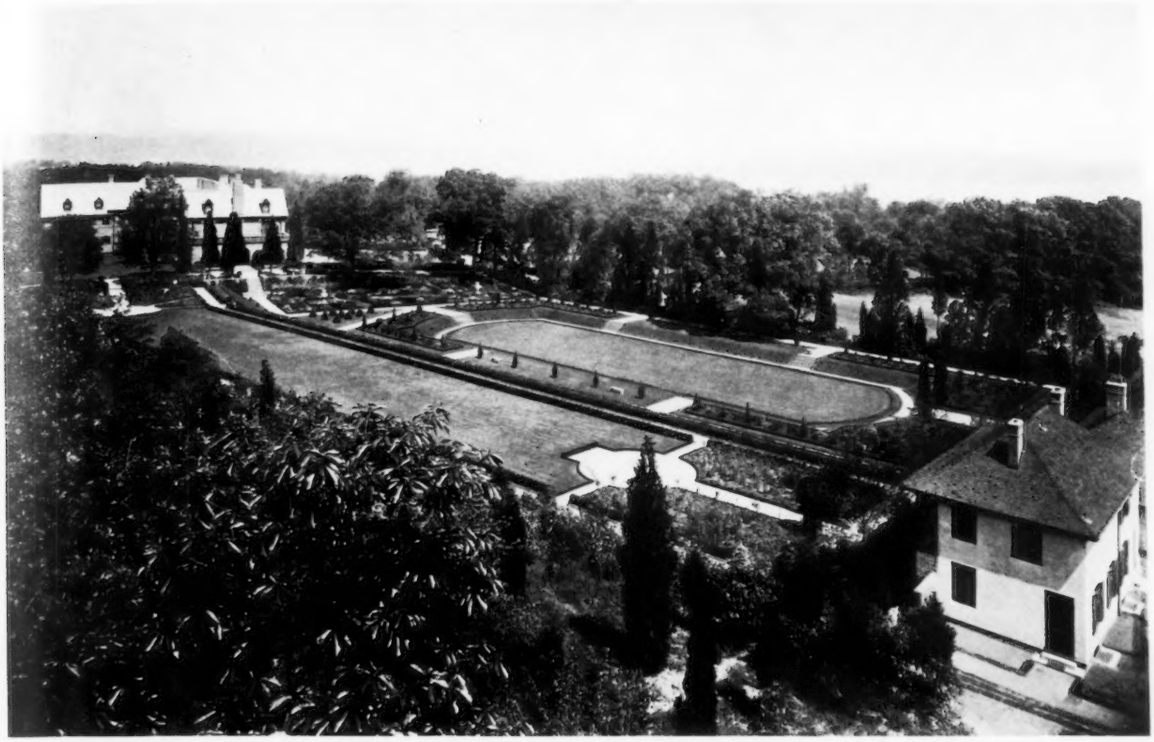
DETAIL IN COURTYARD.



DETAIL OF MAIN FACADE.

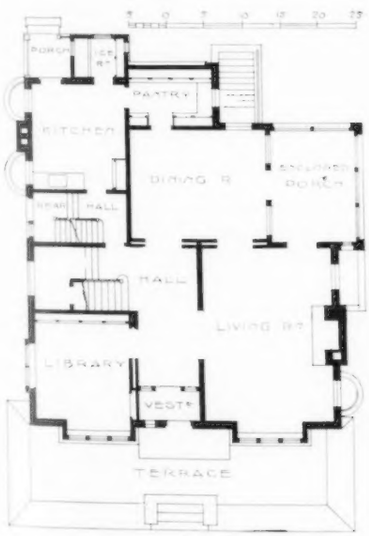
HOUSE AND GARDEN AT OYSTER BAY, LONG ISLAND, N. Y.

CARRERE & HASTINGS, ARCHITECTS.



VIEWS OF GARDEN.

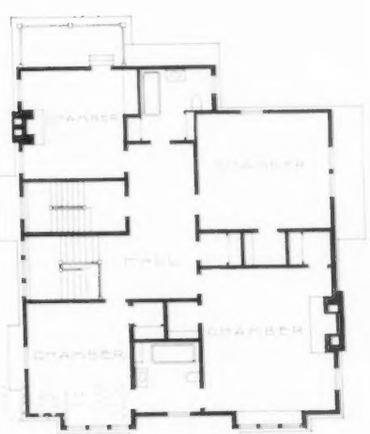
HOUSE AND GARDEN AT OYSTER BAY, LONG ISLAND, N. Y.
CARRÈRE & HASTINGS, ARCHITECTS.



FIRST FLOOR PLAN

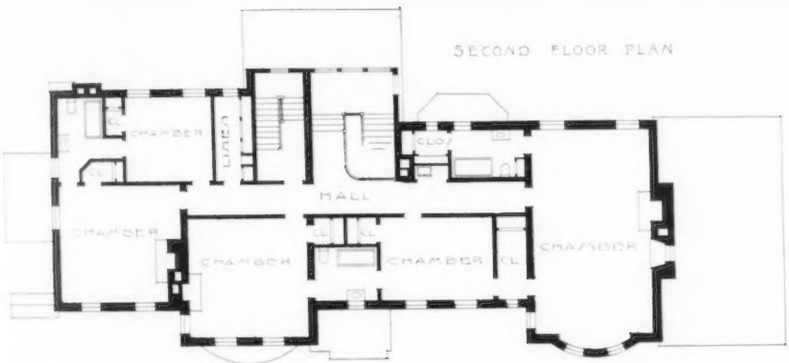
HOUSE
AT
CLEVELAND,
OHIO.

FRANK B. MEADE,
ARCHITECT.

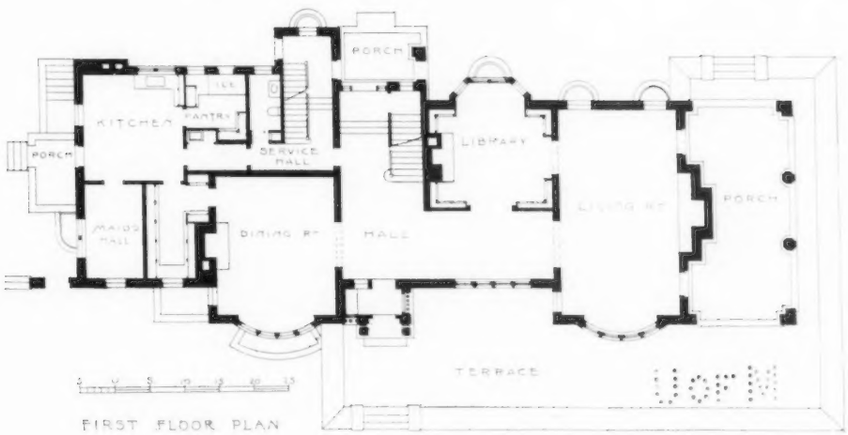


SECOND FLOOR PLAN

SECOND FLOOR PLAN



HOUSE
AT
CLEVELAND,
OHIO.



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HOUSE AT
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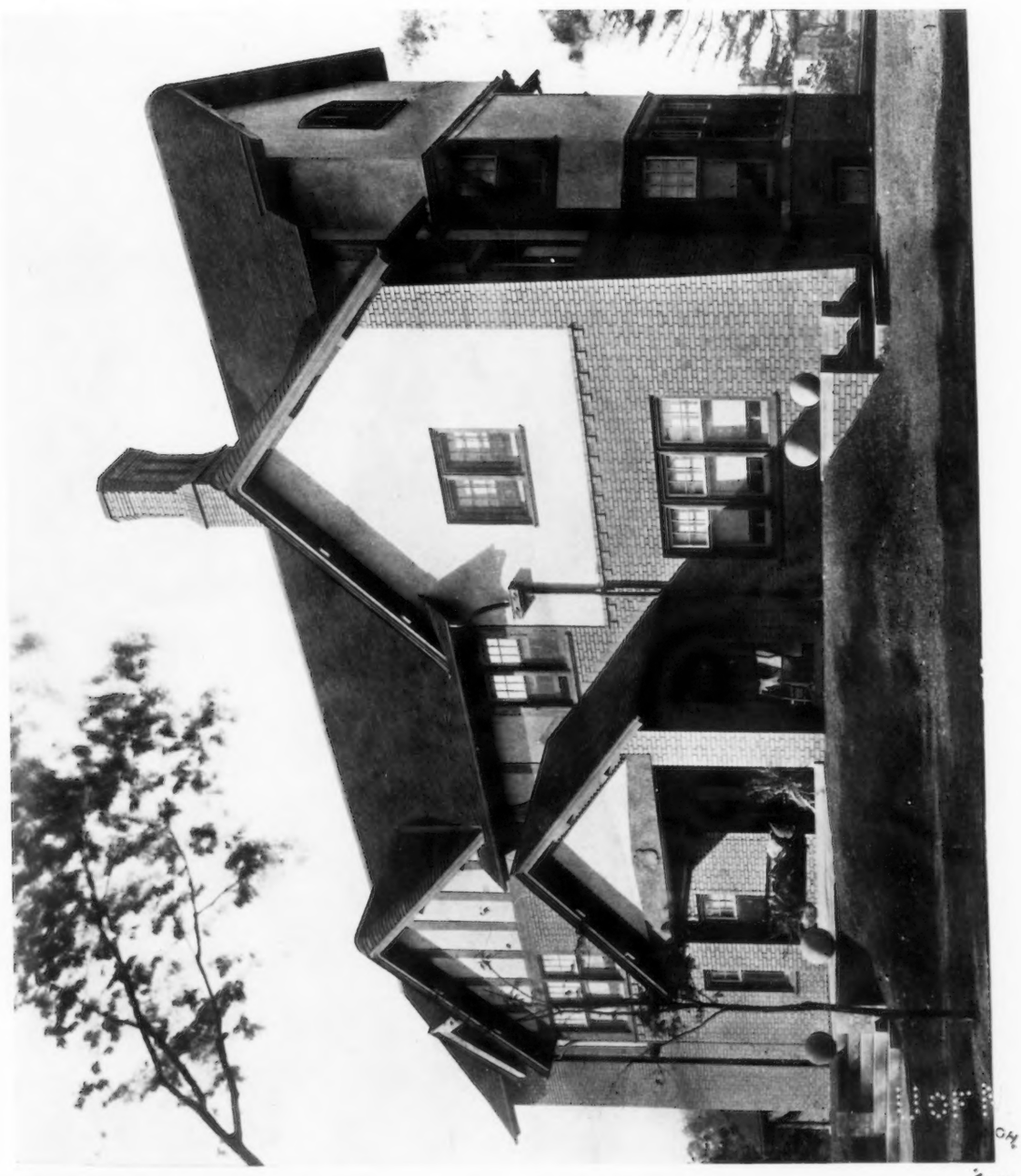

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